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Devoted to the Conversion, Transmission and Distribution of Energy

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JOURNAL OF ELECTRICITY
POWER AND GAS
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PACIFIC COAST ELECTRICAL EXPOSITION

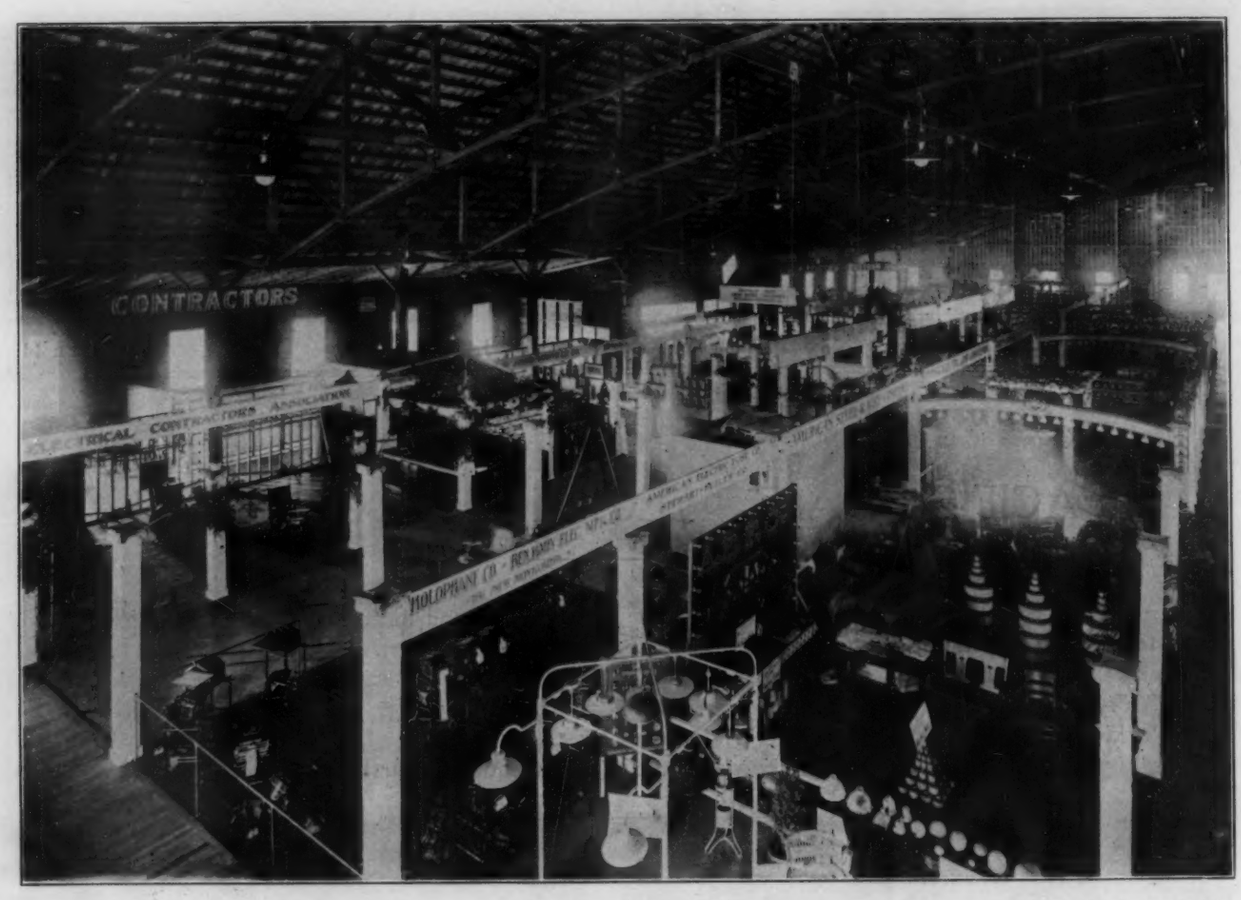
The Pacific Coast Electrical Exposition was brought to a brilliant culmination on Saturday night, September 24, after a successful run of eight days and nights. This, the first electric show to be held west of the Rockies, proved to be more successful than anticipated by even the most sanguine, a conservative estimate placing the total attendance at 40,000. There is now a strong likelihood that this expositon will hereafter be held annually, a large number of exhibitors now wishing to double and even quadruple the space they used this time. The gate receipts were such that a substantial return is assured to each one who took space.

Most of the exhibits were calculated to appeal to the public fancy. There was consequently little to indicate Western pre-eminence in long distance transmission of high tension power, but much to interest the small user. Yet withal, there was many an engineer who found his time profitably engaged in studying some of the newer, if less spectacular, displays.

As compared with the Eastern shows, the spectacular was lacking. An occasional thrill was induced by the exhibition of the apparent inconsistencies of high frequency current in its effects on the human system. The riot of light caused many to marvel, an electric rock drill added a bit of local mining color and a touch of rural life was introduced by electrical milking machines, together with the necessary cows. The wireless telegraph was always the center of an interested throng, as were also the telautograph and directograph.

The prime idea of the show, to educate the public in the many varied uses of electricity, was well carried out. Its stimulus should be beneficially felt for a long time to come in the way of increased demand for electrical apparatus.

General View Pacific Coast Electrical Exposition



Panoramic View of the

Lighting.

The most conspicuous feature, numerically and in point of brilliancy, were the electric lamps. The regular lighting system for the Coliseum provided fifty-six 250-watt tungsten lamps suspended overhead so as to give good illumination to all points on the floor. Naturally one of the most important classes of exhibitors were the lamp manufacturers and their products contributed greatly to the resplendence of the effect.

The National Electric Lamp Association, exhibiting on behalf of its member companies, occupied four booths facing the main aisle in the center of the building and their engineering department gave an extensive exhibit of the latest developments in incandescent lamps. The booth decorations were especially effective, being undoubtedly the most elaborate of any at the show. The entire booth was outlined by decorative arches supported by columns surmounted by gilt capitals and eagles of staff work. In the center of each arch was placed the "N. E. L. A." monogram, and across the outside of the arch was painted, in characteristic old English type, the name of the association. Various sizes of Mazda lamps and Holophane reflectors were suspended from the bottom of the arches. A reception room for the association's guests was built within the booth. This took the form of a Spanish pergola, decorated with autumn leaves and beaded portiers.

The lamp exhibit included three racks, upon which were mounted the various sizes of 110 and 220-volt Mazda and tantalum lamps, the Mazda street series, and the Mazda sign lamps. The new double-wound tantalum lamp for street-car use was exhibited on a rack in a comparative test with the old 64-watt carbon lamp. The different types of Holophane reflectors, of both the Stilleto and Standard lines, were also on display.

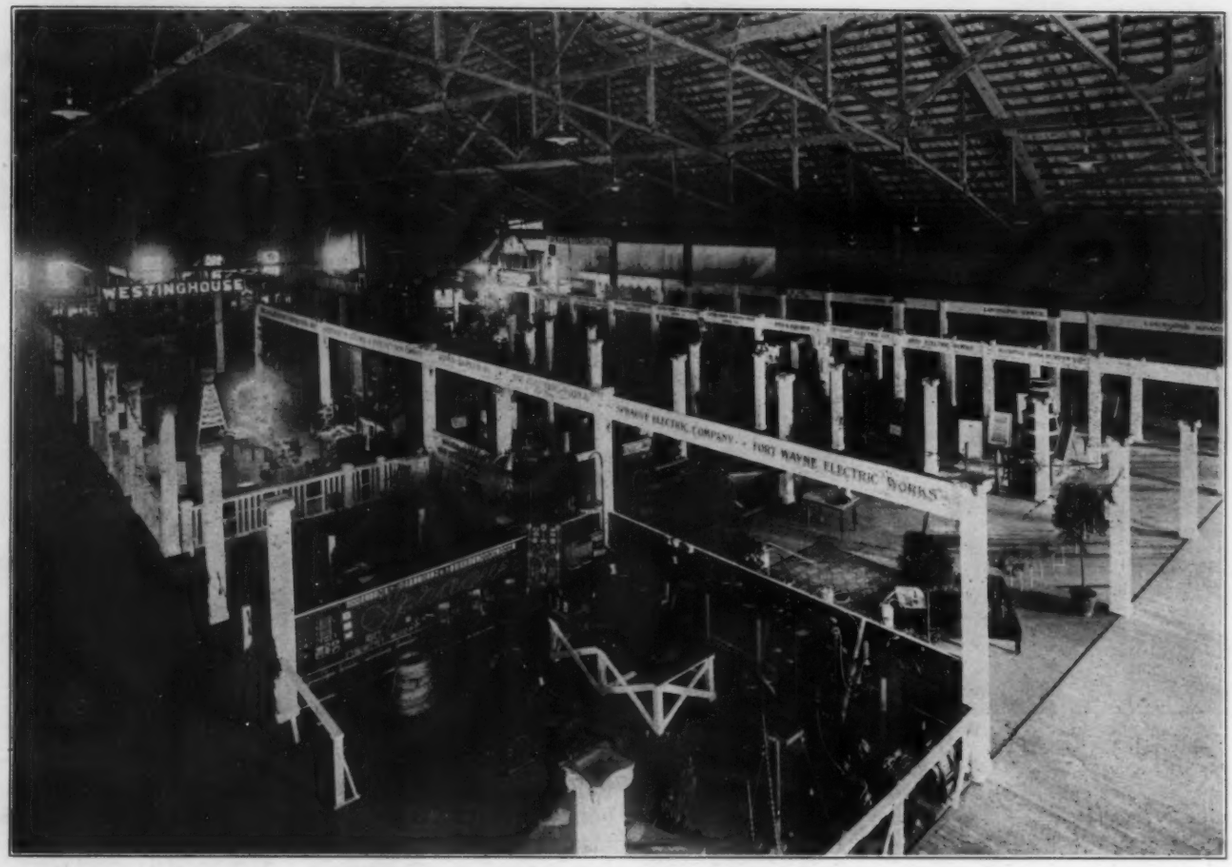
A complete electric lighting outfit for automobiles, including the searchlight, headlights, sidelights, taillight and limousine lights were mounted on a display board, and shown burning as in actual service.

An interesting historical feature of the exhibit was the collection of Goebel incandescent lamps. These lamps were made in the early sixties, were operated from batteries, and were used for advertising purposes in New York City.

A device which showed the principle of the Bunson photometer was exhibited, as well as a "mirror rotator," which illustrated one way of obtaining the light distribution about a lamp.

Two novel features of the exhibit were the samples of 500 and 400-watt Mazda lamps, and the new drawn wire Mazda lamps. Several types of the latter were shown, among which were the 30 and 60-volt train lighting, as well as the regular 40-watt, 110-volt lamps. The drawn tungsten filament is something entirely new, and the exhibit of lamps with these filaments was viewed with interest by the thousands of visitors.

Perhaps the most striking illustration of the effulgence of the Mazda lamp was contained in the



Pacific Coast Electrical Exposition

booth of the **General Electric Co.**, where it was displayed as the "sun's only rival" in a manner that called forth comment from all.

The Westinghouse Electric and Manufacturing Co. exhibited lamps of all types and all sizes on two revolving disks, both low and normal voltage being supplied on each rack. As these lamps contained a large number of colored bulbs it added greatly to the spectacular effect of this company's exhibit. A model street series tungsten system was also displayed.

Joseph Thieben & Co. made a special exhibit of Star and Eastern "Mazda" lamps whose effective arrangement added to the attractiveness of this exhibit. Included in it also was a full display of Howard miniature automobile and candelabra lamps as well as Novelty electric signs and Dull's flashers.

Franklin "Mazda" lamps were exhibited by **Holabird-Reynolds Co.** in connection with their other features hereafter to be mentioned. Linolite lamps for both desk and window lighting were exhibited by **H. W. Johns-Manville Co.** Fostoria lamps were displayed by **Brooks-Follis Co.** and Cooper-Hewitt mercury arc lamps by the **Aylesworth Agencies. The Brumfield Electric Sign Co.** had an elaborate exhibit of standard and colored signs. By means of Pyro flashers they also showed a number of interesting effects in moving signs.

Of even greater brilliancy than the incandescent lamps were the many kinds of arc lamps displayed. From the searchlight on the roof and the flaming arc lamps outside the building to the Trucolor lamps on the inside the electric arc maintained its reputation for intensity.

The General Electric Co. by means of the mercury arc rectifier were enabled to display direct current luminous arcs and flaming arcs, laying particular emphasis on the mechanical construction of their lamps.

Chas. L. Kiewert & Co. displayed a complete line of flame and carbon arc lamps and supplies, including the Siemens flaming arc and the Aurola, Alba, Triplex, Economy and Lilliput arcs. A show window, displaying gentlemen's furnishing goods, was lighted by a Trucolor arc which brought out to good advantage its close approximation to sunlight. A moving picture machine operating with their "B10" carbons for projecting purposes was also in operation.

Parrott & Co. attracted much attention with their exhibit of Grant flaming arcs, just to the left of the entrance. **Jos. Thieben & Co.** exhibited a number of American searchlights and also Stave flaming arcs.

Communication.

Second in numerical importance only to the lights, were the various means of communication exhibited.

The Bay Cities Home Telephone Co. equipped each booth with one of its automatic instruments for the use of all exhibitors, free of charge. At its own booth the company exhibited a working section of its automatic selector system which was explained to all interested by a corps of courteous attendants. The company also showed various types of instruments

National Electric Lamp Association

which it is installing, and provided free telephone service for visitors.

The Pacific Tel. & Tel. Co. had three sound-proof booths at which local service was furnished free of charge to all at the show. On each evening long distance connection was established with some one of the Pacific Coast cities such as Los Angeles, Portland, Seattle or Spokane and free service given to all those that desired to use it.

The Dean Electric Co. exhibited a standard private branch exchange board operating in connection with such automatic equipment as is now being used by the Bay Cities Home Telephone Co. One of the most interesting features of their exhibit was a police Flashlite switchboard operated in connection with a police box and showing the method of calling a policeman on his beat by means of a brilliant red light flashing in the box whenever the desk-sergeant so desires. Another innovation was a complete exhibit of the new wayside service, whereby anyone equipped with the hand microphone provided, can communicate with a Central by plugging in a box placed along well traveled roads and in city streets. This is of particular use to delivery wagons and automobiles. The exhibit also included a common battery harmonic switchboard together with telephones and harmonic converter and ringing machine. A full line of Dean telephones, including the new bedside type, were exhibited.

The Dean Electric Compa.

The Kellogg Switchboard and Supply Co. had a most interesting display of telephone apparatus, laying particular stress upon their railway signal system, which is fast being adopted by all the leading railroad companies as a substitute for the telegraph service. The convenience and accuracy of this method, as well as its economy, was graphically pointed out by the exhibit. A full line of Kellogg telephone and switchboard parts were displayed in glass show cases, including special telephone adaptations for mines and for power companies.

The Telephone-Electric Equipment Co. showed an interesting display of Stromberg-Carlson telephones, the display being designed principally for architects and contractors, as it featured the intercommunicating telephone system for residences and business houses.

The Direct Line Telephone Co. had an exhibit of interest to factories and other places requiring a convenient inter-communicating service which can be rendered absolutely secret.

De Veau telephones were exhibited by the **Electric Railway and Manufacturers' Supply Co.**

Department of Electricity

One of the most novel exhibits was that of the **Department of Electricity** of the city and county of San Francisco, which showed a complete working system of the fire alarm and police signal apparatus as in use in San Francisco. The exhibit comprised three outside fire alarm boxes and a police box connected with their respective central station boards, fire house boards and police station boards, each of which were equipped with many special signaling devices. Particular interest attaches to this exhibit because all the apparatus is made by the department and the system as installed is one of the most complete and up-to-date in the country.

The Directograph was another means of communication which created much popular interest. By means of this machine it is possible to send news from a central station by means of a typewriter and have it mechanically written on a large bulletin board simultaneously at a large number of places. Its purpose is particularly for the transmission of stock exchange reports, prize fight and baseball returns. Its principle of operation depends upon the electrical control of a large number of magnets which move a marking pen upon the board, tracing out the desired words.

The Gray Telautograph Co. exhibited their instrument for electrical transmission of handwriting, which proved of peculiar popular interest.

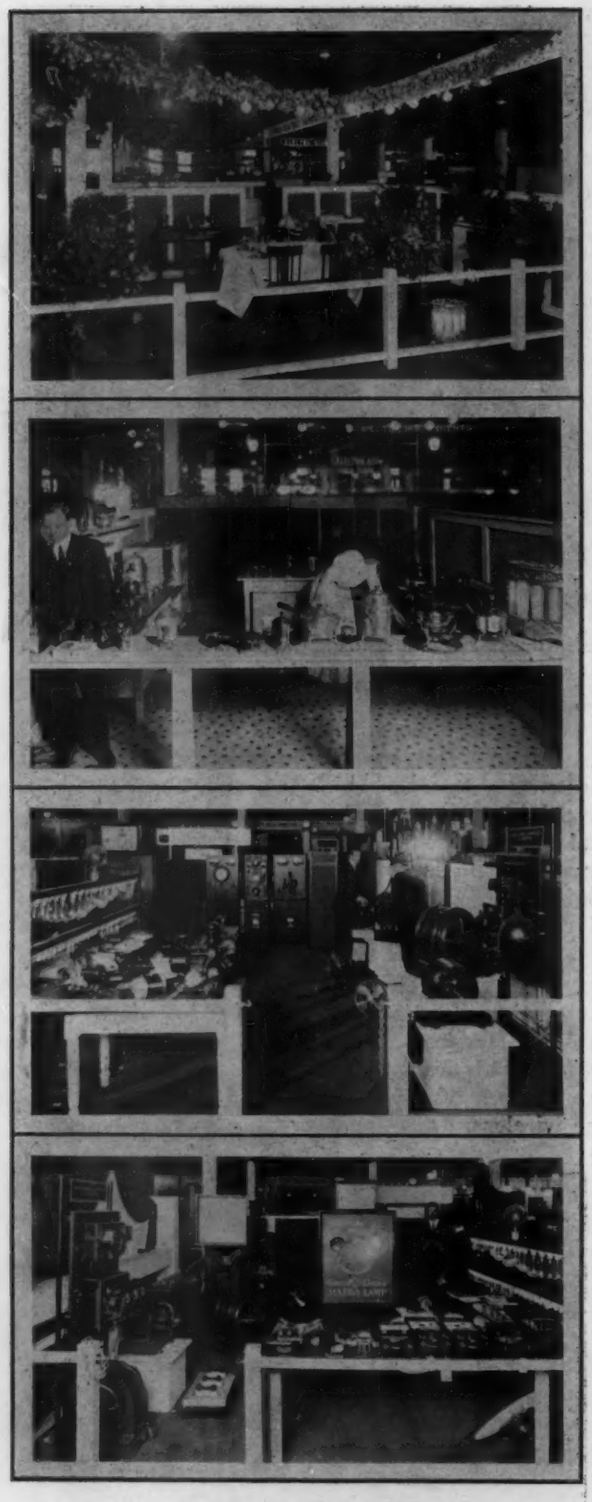
The National Dictograph Co. demonstrated the Dictograph system by means of which the executive is placed in instant communication with all his assistants without the necessity of holding an earpiece or talking into a transmitter, as the instrument transmits speech from any reasonable distance within the limits of an ordinary room, the receiving end being further provided with a small loud speaking horn which amplifies the sound.

A full line of Monarch telephones as well as the Monarch time system was exhibited in the booth of the **Aylesworth Agencies.**

A most noteworthy exhibit was that of the **Western Union Telegraph Co.,** this being one of the few electrical shows for which this company has prepared an exhibit. It included a complete system for sending and receiving messages with operators and messenger boys. Particular emphasis was laid upon their new night letter service and an excellent object lesson given to the public of the great work done by this company.

A wireless telegraph system was installed by the Exposition Company and placed in charge of Mr. William Hanscom, the electrical engineer for the exposition. This feature attracted no little attention from the visitors who were interested in the mysteries of the wireless.

Kellogg Switchboard & Supply Co.



General Electric Company

The San Francisco Gas & Electric Co., occupying one of the large central booths, made no attempt at a working display, but provided a beautifully furnished reception and lounging room with maid in attendance. Here the visitors could rest, ask questions and look over the current magazines, all the while being impressed with the company's motto, the "house of courtesy."

Electric Heating.

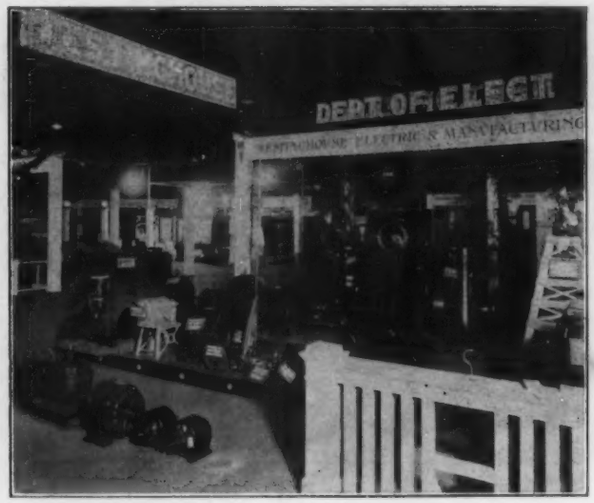
Third numerically, and perhaps first in popular interest, were the electric heating appliances which were exhibited by a large number of companies. Naturally the largest crowd congregated where there were demonstrators, particularly at the large booth of the **General Electric Co.**, one-half of which was elaborately fitted up as an electric dining-room and electric kitchen. The dining-room was handsomely furnished in Mission style, with a drop light on the center table, a luminous radiator in the fireplace and copper chafing dish, percolator and tea kettle, all electrically operated, on the serving table. The electric kitchen was equipped with a standard No. 2 cooking and baking outfit which consisted of a wooden range equipped with all manner of electrically heated devices, each device containing the heating element as an essential part. The new type No. 1 domestic range was here shown for the first time. It consists of oven, broiler, three hot plates and a warming compartment, with the necessary switches and devices for connecting portable devices. These devices are legion in number, including double boilers, frying pans, waffle irons, toasters, tea kettles, coffee percolators, broilers, pancake cookers, water heaters, ovens, etc.

The Telephone-Electric Equipment Co. exhibited an equally complete line of Simplex heating devices, as did also the **Westinghouse Electric & Mfg. Co.**

Each of the three above companies exhibited electric irons, as did likewise the **Holabird-Reynolds Co.**, who demonstrated the Pacific Electric Mfg. Co.'s Hot Point iron.

Closely allied with these electric irons was the exhibit of the **American Ironing Machine Co.**, which included a Simplex electric ironer (motor operated) and a Thor electric washer and wringer. A 1900 washing machine, as well as a number of Westinghouse heating appliances were exhibited by the **Levy Electric Co.**, Electrical water heaters shown included the Diamond and Cutler. The Consolidated Electric Appliance Co., represented by **Otis & Squires,** displayed Pluto electric irons, electric radiators and instantaneous water heaters.

Otis & Squires



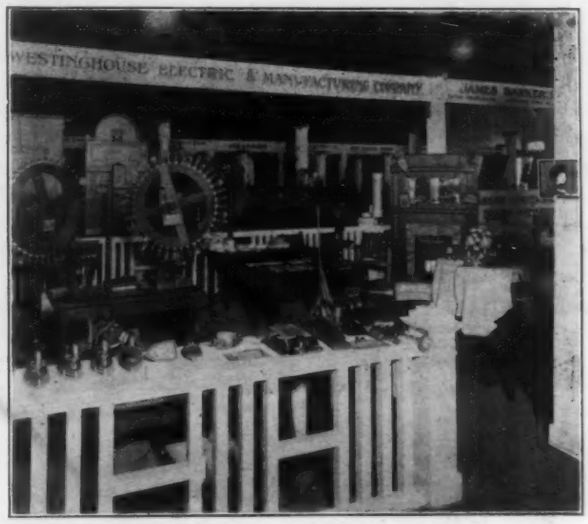


Exhibit of Westinghouse Electric & Manufacturing Company

The City Electric Co. exhibited a model underground vault which was equipped with two 11,000-volt combined switch and fuse boxes, and a 500-volt, three-wire, large capacity, six-way junction box made by the company, and a General Electric, type H, 100-kw., oil-cooled transformer. This concrete vault is typical of the company's manholes throughout the city and impressed the visitors with the absolute care necessary in underground power transmission.

The City Electric Co.

Motors.

The most elaborate exhibit of motors was that of the industrial and power department of the **Westinghouse Electric & Mfg. Co.**, which featured vacuum cleaners, ice cream freezers, buffers, grinders, polishers, sewing machines, drilling machines, meat choppers, and fans, all driven by Westinghouse motors. They also exhibited a miniature oil well derrick showing the operation of drilling, pulling and pumping oil in the California fields. A complete line of every type of motor manufactured by this company was represented.

The General Electric Co. exhibited a large number of induction motors and exemplified their application to sewing machines, buffing machines and to their new breast drill. They exhibited their auto-control for both direct and alternating current and a number of starting compensators.

The Fort Wayne Electric Works had on display a large number of special and standard power motors ranging from 1/100 to 1/4 horsepower. They also showed a Giles type E automatic steam engine connecting with a Fort Wayne generator and the Paul system of air compressing and pumping.

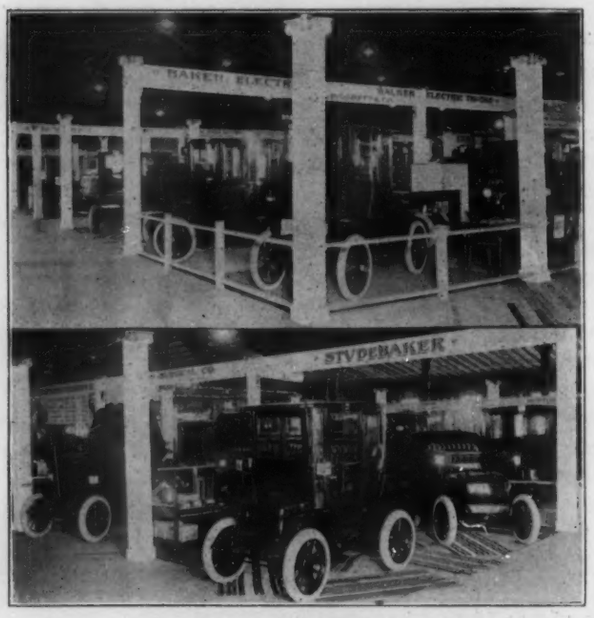
The Century Electric Company of St. Louis exhibited a number of single phase Century motors ranging from ¼ to 5 horsepower.

Parrott & Co. had an interesting exhibit of Kimble alternating motors, one of these driving a Chandler-Price printing press. A number of small motor applications were shown, including a motor driven fan. Crocker-Wheeler motors, generators and dynamos of all types were exhibited by **Chas. L. Kiewert & Co.**

Chas. L. Kiewert & Co.

Electric Vehicles.

Perhaps the most ambitious of all classes of exhibits were the electric automobiles, it being believed that such a large number of different makes were never before assembled at an electrical show. **R. B. Daggett & Co.** showed three Baker electrics and a Walker electric truck in addition to a number of demonstrating cars. The **Studebaker Co.** exhibited four vehicles, the **Columbus Electric** two, a roadster and coupe, there also being a runabout and stanhope for demonstrating; the **Detroit** two coupes equipped with Edison storage batteries; Rauch & Lang, represented by **G. A. McDougald & Co.**, a coupe; the **Babcock** one car, and the **Ideal** four passenger electric coupes. The storage batteries of these were supplied with direct current either by means of a motor generator set or by mercury arc rectifiers.



Electric Vehicles

The Electric Storage Battery Co. exhibited a full set of storage battery trays showing the "Exide" battery as furnished for the various vehicle manufacturers, the names appearing on the trays. In connection with this exhibit there was also a full line of "Exide" vehicle battery parts. The "Exide" sparking battery for gasoline engine ignition was shown complete and in section, together with a full line of parts. The Electric Storage Battery Co. also exhibited a low voltage tungsten lighting outfit, recently developed for use in farm houses and country residences. The outfit consists of a gasoline engine providing a small 40-volt d. c. generator, a storage battery of 16 cells of the "Chloride Accumulator" with three counter cells for regulation and complete switchboard with ammeter, voltmeter, rheostat, circuit-breaker and circuit switches. The current from the set was used to supply about fifty 8 and 16-candlepower, 32-volt tungsten lamps.

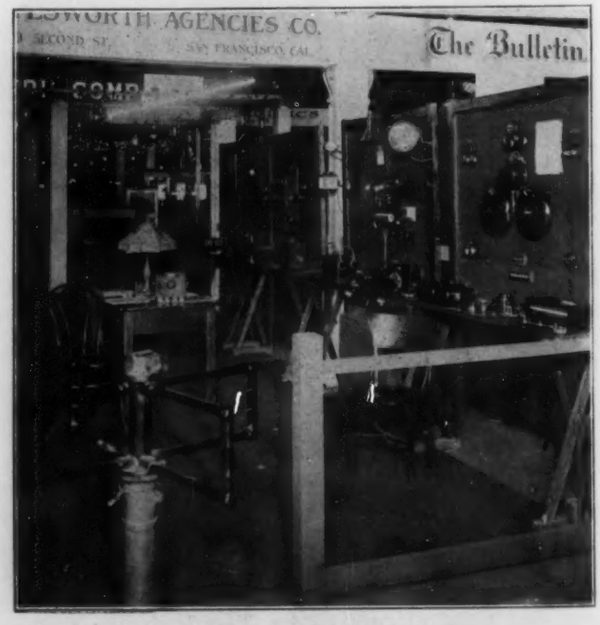
Hughson & Merton exhibited the Connecticut system of ignition for automobiles, the Jones electric automobile horn, the Jones live map and the Jones speedometer, this exhibit being in charge of H. W. Coffer, the factory representative. The **Aylsworth Agencies Co.** exhibited the Apple Electric Co.'s automobile light and ignition system.

American Ever Ready Co.

The American Ever Ready Co. exhibited a line of novelties and dry batteries of general interest to automobilists. These included electric flashlights, sparking plugs, speedometers, automatic automobile starters, wind shields, tire chains and automobile accessories. The "Eveready" battery for ignition purposes and the "Three Crescent" telephone battery, manufactured only in San Francisco, were also exhibited, together with a large number of vacuum bottle and electric novelties.

Switchboards and Instruments.

Otis & Squires, representing the H. Krantz Mfg. Co., the Cutler Hammer Co., Columbia Incandescent Lamp Co., L. B. Allen Co., Dossert & Co., American Conduit Mfg. Co., Knoblock-Heideman Mfg. Co., Mathias Klein & Sons Co., Machado & Roller, Paragon Sellers Mfg. Co. Van Nort Brush Co. exhibited a complete line of switchboards, panel boxes, switches



Aylesworth Agencies Co.

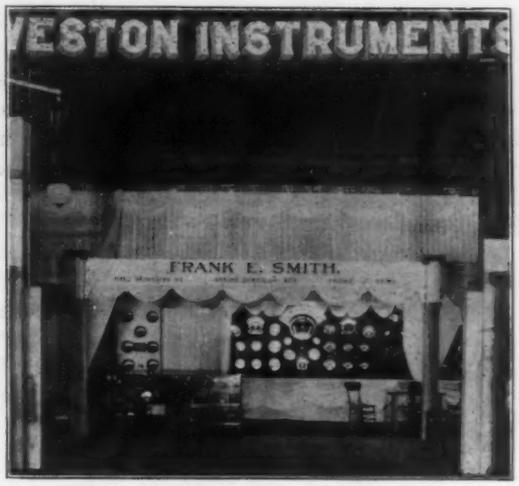
American Electric Fuse Co.

and high tension apparatus. These included a two-panel Krantz switchboard, Krantz knife switches, Cutler-Hammer push button, specialties, magnets and controlling apparatus, Roller-Smith instruments, Klein's linemen's tools, Paragon ground cones, Blackburn ground clamps, Paragon self-tying knobs, Ironite drop wires and Dossert connectors.

The Electric Railway & Mfrs. Supply Co. exhibited a seven panel board of their own manufacture. This board was equipped with Trumbull fuses, Westinghouse voltmeters and ammeters, Duncan wattmeters and Trumbull switches.

The Drendell Electric and Mfg. Co. of San Francisco exhibited a number of switchboards recently made for their customers, including a three panel board to be delivered to the Decker Electric Co. for the Cuoyaga Rubber Co. of Mexico, a three panel board for the Central Electric Co. at Fort Whipple, Arizona, and a panel box for the Pacific States Electric Co.'s Alcatraz Island contract. They also showed a number of copper connectors and remote control switches.

Electric Railway & Manufacturers Supply Co.

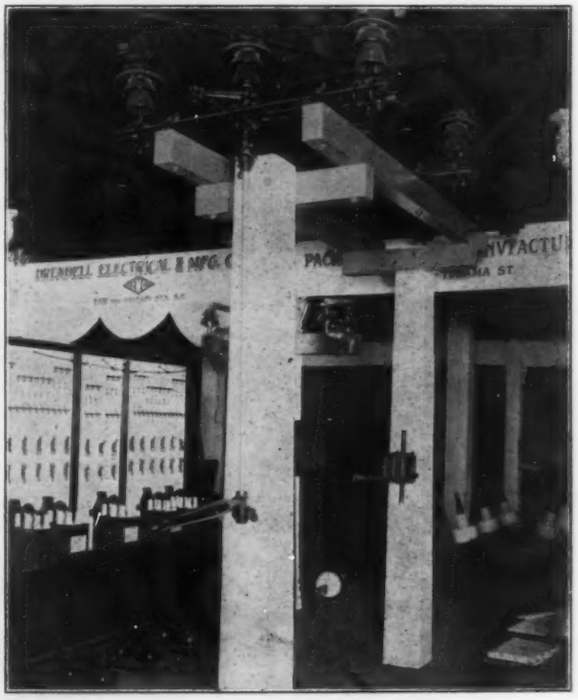


Frank E. Smith

The Westinghouse Electric & Mfg. Co. through their detail and supply department showed a complete line of transformers and line circuit breakers, switches and kindred devices.

The General Electric Co. exhibited a direct and alternating current switchboard in connection with a mercury arc reflector which supplied current for stereopticon views showing a number of lantern slides illustrating their heating appliances. Testing instruments were also exhibited by the General Electric Co., Westinghouse Electric & Mfg. Co. and Otis & Squires.

Frank E. Smith, representing the **Weston Electrical Instrument Co.,** showed for the first time the new Weston switchboard wattmeters, both single and polyphase, synchroscopes, power factor meters and frequency indicators, all of which were in operation on the main leads supplying the exposition with light and



Pacific Electric & Mfg. Co.

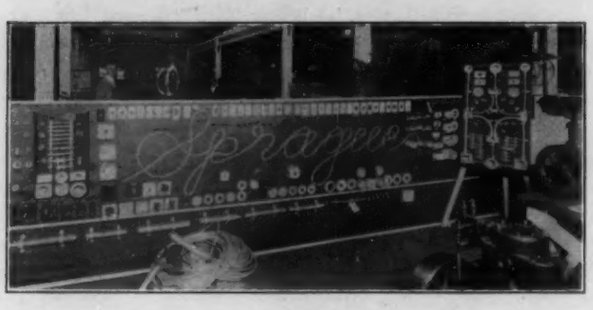
power. Besides these a full line of regular switchboard and portable instruments were shown.

The Pacific Electric & Mfg. Co. exhibited an oil switch with electric control for 80,000 volt service and a pole top switch for high tension power lines. A number of disconnecting switches for lower voltages, together with the Wooll motor protecting switches were also exhibited.

The American Electric Fuse Co. displayed the Allen-Bradley line of alternating and direct current rheostats with indestructable resistance, Muskegon spark coils for marine and gas engine use, black enamelled magnet wire and wireless coils and telephone protective equipment. In the same booth the Steuart Fuller Co. demonstrated Vulcan electric soldering and curling irons and displayed Pierce drills.

Wires and Cables.

The American Steel & Wire Co. had an elaborate exhibit of all the different kinds of wires and cables carried in stock on their San Francisco warehouse. These included copper and iron wire, bare and insulated of all sizes and for all purposes, from a magnet wire to a million circular mil cable. They also showed a complete exhibit of rail bonds and pole steps.



Sprague Electric Co.

The Sprague Electric Co. had a complete exhibit of conduit conductors, air and steam armored hose, all of particular interest to contractors.

Standard Underground Cable Co.

The Standard Underground Cable Co.'s exhibit consisted of coils and reels, bare and insulated copper wire, lead covered cables, bare and insulated copper clad wire, armored terminals, insulating tape and compound and cable accessories. Many people were interested in a sample of the submarine cable used by the Bay Cities Home Telephone Co. across San Francisco Bay.

The National India Rubber Co. exhibited boards showing samples of cable cords, wires and cables, and railway signal wire.

Vacuum Cleaners.

Electric vacuum cleaners of all sizes and shapes were greatly in evidence and attracted much attention. These included the Duntley, Hoover, Little Giant suction sweeper, the Keller-Santo and the Monarch.

Miscellaneous.

The Reed Electric Works of Mayfield, California, demonstrated their electric welding machine.

The H. W. Johns-Manville Co. displayed their "Noark" service subway boxes, "Noark" enclosed fuse material, J-M dry batteries, fibre conduit and fittings, asbestos roofing, insulating materials and fittings, in addition to the J-M Linolite system of electric lighting. Some good examples of electric sign or weatherproof

H. W. Johns-Manville Co.

J-M Linolite lamps were exhibited, also type "B" window reflectors and some new corrugated glass type "E" reflectors. J-M Linolite desk and table lamps and some special silver-plated reflectors for picture lighting were also shown. J-M porcelain insulators which are made for all classes of service up to as high as 100,000 volts were represented by a complete line. These insulators are now made in both petticoat and disc types together with pins, fittings, etc., for long distance transmissions and other systems.

Overhead material was shown in quite a variety of products among which may be mentioned the "Giant" strain insulator. J-M friction-tapes and splicing compounds were well shown, the tape in six brands, which makes a permanent water-tight, high grade insulating compound was represented by two brands. The H. W. Johns-Manville Company make a great variety of insulating materials for various kinds of apparatus, such as arc deflectors for controllers, special plugs for heating and cooking devices, electrobestos shapes and samples and moulded mica weatherproof lamp sockets, which are so extensively used in parks and out-of-doors decoration, in paper mills, breweries, laundries, anywhere in fact where acid fumes or moisture is present.

Brook-Follis & Co., one of the few jobbers who exhibited had an interesting display of all kinds of electric apparatus, including electric poles, sockets, switches push buttons, lamps and telephone apparatus, and vibrators.

The Southern Pacific Company, occupying one of the large central spaces, had a working model of their automatic block system, together with two full sized block towers, stereopticon views of the Missions of California and distributed a general line of literature.

The Walters Surgical Instrument Co. exhibited a complete and interesting line of X-ray apparatus, Crooks tubes, electro static apparatus, medical coils and therapeutic lamps and appliances.

The Paraffine Paint Co. had an exhibit of insulating tape and compounds, Malthoid roofing, building paper, deadening felt, etc.

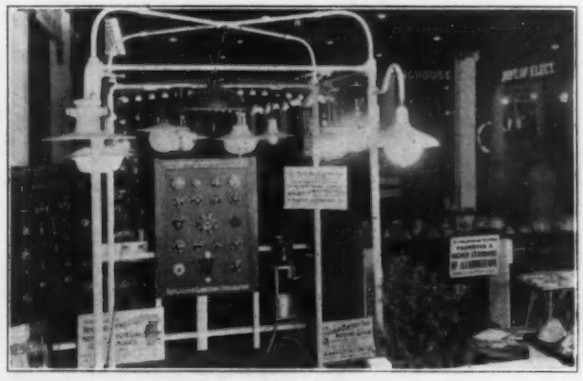
A number of electric vibrators, including the Golden, the Universal and the Arnold were exhibited by various companies.

John R. Cole & Co. exhibited Bossert conduit knockout boxes, covers, bushings; Chase-Shawmut Co, circuit breakers, enclosed fuses, cutouts, Electric Railway Equipment Co.'s overhead line material; Hubbell pull sockets, flush plugs, guards, shades; W. N. Mathews & Bro.'s guy anchors, lamp guards, splicing joints; the New York Insulated Wire Co.'s rubber covered wires for telephone, light and power; the Stanley-Patterson "Faraday" bells, waterproof floor boxes and wireless batteries.

John R. Cole Co.

The Benjamin Electric Manufacturing Co. of Chicago had a particularly attractive and well arranged exhibit. Their exhibit, in the main, consisted of a large white enameled frame in the form of a crossed arch. On these arches were arranged the many types of Mazda and other forms of fixtures which this firm gets out. Among the most advanced types was the new street series socket which caused considerable favorable comment, due to its simplicity and exceptionally neat and strong appearance. A Cargo light of heavy spun copper and galvanized steel guard was also displayed. A complete line of their new reflector sockets was shown, and created much interest owing to their adaptability to industrial lighting, which is receiving so much attention at this time from illuminating engineers. Two handsome sample boards were arranged at the rear of the arches, on which were mounted a complete line of the Benjamin Electric Manufacturing Co.'s wireless clusters and other lighting appliances.

The Holophane Co. had an attractive booth, in which was shown a complete line of globes and reflectors manufactured by that company, and particularly the new "Stiletto" prism type reflectors. The booth was tastily arranged, offering a restful place for the many out-of-town customers who visited the exhibit. The certer piece of the general illumination of the Coliseum was a large Holophane sphere in which were colored lamps.



Holophane and Benjamin Electric Mfg. Companies.

Kohler & Chase had a complete line of automatic pianos, a number of which were motor driven, including a large Wurtlitzer organ which furnished music for the Exposition.

Holabird-Reynolds, in addition to the "Hot Point" and Franklin and Mazda lamps already described, had a complete exhibit of Ohio Brass insulators.

The Electrical Contractors' Association had a comfortable reception room and exhibited some of their work. Power was supplied from a 5 kw. Westinghouse generator driven by an 8 h.p. Union gas engine to operate a number of tungsten and carbon lamps arranged to spell "Modern Wiring Methods." A glass switchboard made for the contractors by the Jupiter Switchboard Co. of San Francisco and also one made for the Pacific Fire Extinguisher Co. were on display.

The Burroughs Adding Machine Co. had an interesting display of motor driven adding machines.

The Electrical World, the **Electrical Review and Western Electrician,** and the **Journal of Electricity, Power and Gas** had reception booths, the Electrical Review being represented by its managing editor, Mr. A. A. Gray.

COLORADO ELECTRIC POWER & RAILWAY ASSOCIATION.

The eighth annual convention of the Colorado Electric Power and Railway Association was held September 21-22 at the Hotel Colorado, at Glenwood Springs, Colorado. The association was well represented, about seventy-five members being present.

The meeting was called to order by President W. T. Wallace at 2 p. m., Wednesday, September 21st, who made a short address; Mr. Howard L. Aller of the General Electric Company of Denver, read a paper on the Mazda Series Street Lighting, which was well received. An interesting discussion followed. After a paper on Motors, the question box was taken up, a great deal of interest being taken. The meeting was then adjourned to convene on Thursday, 10 a. m. The convention opened with a paper read by J. M. Connelly of Denver on "Cultivating Friendly Relations With the Public," followed by a lively discussion. The next paper read was by J. C. Lawler of Colorado Springs on "Distributing Pole Lines." This was also an interesting paper was under discussion. This concluded the morning session.

The afternoon session was called at 2 p. m. and was a short one. A paper on the "Creosote Treatment of Our Native Lodgepole Pine Pole" was read by Geo. R. Ogier of Denver. After a short discussion the meeting adjourned to witness a baseball game between the Electric Club and the Association team. The Association were the winners, the score being 13 to 6. During the game the Sons of Jove sold peanuts, chewing gum, cigars and soda-pop.

In the evening an executive session was held.

The Friday morning meeting convened at 10 a. m. and was opened by an interesting paper, read by A. L. Jones of Denver on "Rotary Condensers, Induction Generators on Transmission Systems." This was followed by the report of the committee on grounding secondaries, read by J. A. Clay, chairman of the committee. Quite a lengthy discussion followed the reading of the paper. The meeting then adjourned.

The afternoon session, called at 2 p. m., was opened with a paper read by E. M. Gilbert on "Steam Turbines." After the discussion of this paper, the question box was taken up. General business followed the question box. Under this head it was suggested that all papers to be read before the convention should be prepared at least two weeks before the convention convened so as to give members time to prepare themselves and become familiar with the subject.

In the secretary's report it was shown that there were 52 active and 55 associate members, a gain of two members over last year. The new officers for the ensuing year were next elected: President, H. L. Corbett of the United Hyroelectric Co., of Georgetown, Colo.; vice-president, J. A. Clay of the Animas Water & Power Co., of Silverton, Colo.; secretary and treasurer, F. D. Morris of Colorado Springs; executive committee, W. T. Wallace of Canyon City, J. F. Dostel of Denver, G. B. Tripp of Colorado Springs; advisory committee, J. J. Cooper, A. L. West, C. H. Williams and J. A. Beeches; membership committee, B. S. Manual, S. B. Bechey and H. L. Allen.

Papers read will be published in the "Journal" during the next few issues.

PACIFIC COAST GAS ASSOCIATION.

The Eighteenth Annual Convention of the Association which adjourned Wednesday evening, September 21st at one of the most sumptuous banquets ever given by it, has been voted the most successful ever held by the Association.

There were sixty-six active and seventeen associate members at this convention and one hundred and fifty members in attendance.

Officers and directors for ensuing year are: President, Frank A. Leach, Jr., Oakland; vice-president, Wm. Baurhyte, Los Angeles; secretary and treasurer, John A. Britton, San Francisco; assistant secretary and treasurer, Henry Bostwick, San Francisco. Directors: H. E. Adams, Stockton; H. W. Burkhart, Los Angeles; E. C. Jones, San Francisco; Joseph M. Berkley, Los Angeles. Editors and Committees: Wrinkle editor, F. C. Millard, Los Angeles, Cal.; experience editor, John D. Kuster, San Jose, Cal.; novelty editor, John Clements, Oakland, Cal.; librarian, E. C. Jones, San Francisco, Cal. Committee on Gas: Engineers' degree, E. C. Jones, L. P. Lowe, John A. Britton; advisory board, Sherwood Grover, W. J. Dorr, Frank Foveaux.

The next meeting will be held at Oakland during September, 1911.

An interesting exhibit of gas appliances was held at the skating rink, West Sixth street, open to the public the entire week; this proved to be a great attraction and deserves no little praise for its attractive appearance.

The companies exhibiting were: The Buck's Stove Company, the Welsbach Company, Trenkamp Stove and Manufacturing Company, the Economic Gas Appliance Company, the Patriot Jewel Stove Works, the Humphrey Water Heater Company, Lawrence & Co., the Ruud Manufacturing Company, the Sprague Meter Company, the Pittsburgh Water Heater Company, the Pure-Air Range and Grate Company, Perfection Gas Furnace Company, the W. M. Crane Company, George M. Clark & Co., the Capell Sales Company, the Reznor Manufacturing Company, the Hammer-Bray Company, Van E. Britton and the Eclipse Gas Stove Company.

Examinations for steam engineers, first and second class, are announced by the United States Civil Service Commission, on October 19, 1910, to fill vacancies as they may occur in the departmental service at Washington, D. C. The examination will consist of letter writing, practical questions in mechanical and electrical engineering (comprising the construction and operation of the heating plant and electric lighting and elevator machinery in first-class public buildings), and training and experience in mechanical and electrical engineering.

Examination for electrician's helper is announced by the United States Civil Service Commission, on October 19, 1910, to fill vacancies as they may occur in any branch of the service in the position of electrician's helper. The usual entrance salary is $600 per annum.

THE PREVENTION OF ACCIDENTS.[1]

BY JOHN P. COGHLAN.

The introduction of machinery brought many new risks and hazards into all modern employments. At first the tendency was to consider the additional accidents which followed new appliances as mere incidents to improved methods and increased production. But time proved this to be a false view. It showed that while every effort was made to make more and better machinery, little or nothing was done to insure safety in operation. Moreover, it demonstrated that additional accidents meant an extra outlay of capital in repairs and in damages for killed and injured workmen, and, often, a loss in production, in that each accident affected the temper and spirit of workmen, and thus reduced their interest and efficiency.

Once these conditions became manifest, employers in many industries set about to correct them. At first the effort was to prevent a repetition of accidents that had already occurred, and to that end faults and defects that had produced injury were corrected and repaired. In other words, accidents had to occur before defects were seen and remedied. But eventually, it was found that accidents could be foreseen. This discovery naturally led to a study of operating conditions and finally to a detailed inspection intended to prevent accidents. Wherever inspection was taken up systematically it soon developed into well organized safety departments; so well, in fact, that today many industrial corporations maintain safety superintendents equal in rank to other heads of departments. These superintendents generally head an organized office force and a corps of trained inspectors. Usually their inspectors are experts in the operation of machinery and oftentimes in complicated methods of manufacture. Not infrequently, they are specialists in the manufacture and operation of one particular class of machinery.

These inspectors devote all their time to studying the causes of accidents and the means of preventing them. They carry on a detailed inspection, reporting every defect. Often they report to their superintendent daily, frequently illustrating their work with photographs. In their reports they embody suggestions from foremen and superintendents, and often from workmen. And in all cases they accompany their reports with recommendations showing how and where defects in operation may be remedied.

In some corporations the recommendations of such inspectors are submitted by the safety superintendents to a board or committee. Usually this board or committee is made up of the superintendent himself, and two or four of his assistants. Sometimes it is composed of the superintendent, the casualty manager and an engineer.

In many corporations every accident is investigated by a committee specially appointed for that purpose. Oftentimes the committee is composed of foremen and superintendents; at other times of workmen taken from the department in which the accident under investigation occurred. In every instance the committee is authorized to make a complete investigation and to report how to avoid like accidents. Wherever a corporation has had the foresight to appoint either of these committees it usually has been progressive enough to adopt the recommendations submitted to it.

The United States Steel Corporation has maintained a permanent committee on the prevention of accidents since April 1st, 1908. This committee is composed of five members selected from the most prominent casualty managers of the constituent companies. It employs a full corps of inspectors and considers some two hundred recommendations a month. In the first year of its existence it put into effect over two thousand improvements suggested by its inspectors.

In some of the subsidiary companies of the Steel Corporation, two committees on accidents are permanently maintained in each mill or plant. One of these is called "the foreman's committee"; the other "the workmen's committee."

The foremen's committee is generally composed of the plant superintendent, his chief mechanic and a department foreman or two. Some of the members are kept on the committee permanently, but the foremen are changed from time to time in order to give experience to the greatest number. Each month the committee makes a complete inspection of the plant. It not only examines machinery, but every detail of the plant, even to floors and stairways, and makes a report recommending such changes and improvements as may tend to prevent accidents. Should an accident occur during the month, the committee makes it the subject of a special investigation and a special report.

The workmen's committee is kept separate and distinct from the foremen's committee, and is made up of workmen exclusively. One month it may be composed of a machinist, an electrician and a carpenter, another of an engineer, a pipe fitter and a wireman, and so on until every man in the plant has had a term of service. The members of the committee are selected by the plant superintendent in consultation with his foremen. Each serves a month. The committee makes one inspection a week and reports in writing the result of its labors. As each member retires from the committee he is asked to continue his interest in the work and to report to succeeding committees anything conducive to his safety or to the safety of his fellow employes. In this way attention is held indefinitely, often to the extent that members of early committees go on making suggestions months after their terms of service have expired.

In some plants it has been found advisable, apart from these committees, to employ special inspectors for certain kinds of machinery, such as cranes, engines and elevators. Usually, such inspectors have expert technical training and are required to make complete reports upon the machinery examined. They have power to shut down any machinery found defective or dangerous.

Wherever safety committees have been appointed the effect has been beneficial. It has been found that

[1] Paper read at the eighteenth annual convention of the Pacific Coast Gas Association, September 21-24, 1910.

the workmen take a new interest in safety appliances; that they find them useful and make efforts to keep them in place, whereas, before, they opposed safeguards and did little to keep them up; and that they suggest repairs and protection devices which would often escape an outside inspector.

Furthermore, experience has shown that these inspections have a moral value in that they serve to stimulate those who have the care of machinery to greater caution and more careful operation. The knowledge that defects once found will be reported once a week until repaired, keep men on their mettle and cause them to see that repairs are promptly made.

As a result of recommendations made by inspectors and safety committees in the steel corporation, stairways have been built to all overhead steam valves and connections, so that such valves and connections may be quickly reached and safely worked upon. All walks along which it is necessary to travel for the inspection or repair of steam pipes have been provided with handrails, and every stairway and walk has been specially lighted. Ladders for reaching pipes or connections of any kind have been entirely abandoned.

Danger from exploding gauge glasses has been eliminated by using a guard made of sheet metal which can be turned in front of the glass when anyone is working about it, and at other times swung back so as not to shut off the view of the register.

"Non-return valves" have been placed in all boilers and steam pipes, and so fitted as to close automatically in case of a break of any kind, thus bringing the system under control without the risk of closing the valves by hand.

In one plant of the Steel Corporation an inspector checking up accidents found that injuries frequently happened to men engaged in repairing boilers, through wrong valves being turned and steam admitted to the boilers. Examination showed him that these occurrences resulted from mistakes in identifying a particular valve which was often one of a great number in a long row, all exactly alike. To guard against such mistakes thereafter he caused these valves to be numbered, and red warning signs marked: "Danger—Do not Remove," to be hung on them when anyone was in a particular boiler. Whenever practicable, he made it the duty of the men doing the work to place these warning signs.

Many mills now have engines equipped with an attachment to stop them in case the governor breaks or becomes ineffective. Others have all their large engines equipped with automatic stop valves with speed limit attachments. These are intended to shut the engines down automatically when they exceed a certain safe speed. In one mill of the Steel Corporation there are push buttons in various prominent places, by which any engine can be instantly shut down. Each of these buttons is marked with a blue light which is never allowed to go out. If a man is caught in the machinery or a breakdown occurs, one of these buttons can be pushed and the machinery instantly stopped. Nearly one hundred of these stops have been installed in this particular mill.

These buttons operate by electricity, and, to insure that they are always in order, they are used each day to start the engines. Furthermore, it is required that each button be pushed once a week with a man at the engine throttle to see that it works properly. In this same mill "butterfly" valves (valves which close instantly by pulling a lever) have been installed as an additional protection. Chains or wire ropes are carried from the valve lever to convenient points so that the engines can be stopped from almost any part of the mill. Similar appliances have been adopted in this and other mills to stop electric motors, which are also operated by electric buttons placed at prominent points in the mill, and always accessible. Ropes, too, are often extended from the machinery operated by such motors to switches which can be pulled in emergency and the machinery immediately stopped. In one mill it is reported that a workman's hand had been caught in a roller, and that on his crying out, several fellow operators pulled the rope together, and so quickly that the switch was torn from the wall, and the motor instantly reversed, with the result that only the tips of the man's fingers were caught, whereas, without the rope his whole hand would probably have been mangled.

In the mills of the American Steel and Wire Company inspectors discovered some years ago that many of the most serious accidents occurred in the operation of cranes. They made a number of recommendations which were immediately put into effect. Later, an order was issued from the management that all specifications for new cranes should provide for all known safeguards. Among others, there were specified:

A foot walk on the side of the crane with a toe board along the edge; covering for all exposed gears; limit switches to prevent loads being lifted too high and breaking away from the drum of the crane; a safety switch on the upper part of the bridge, by which a workman could prevent anyone starting the crane from the cab while he was at work; for safety couplings, breaks and bumpers; a gong by which the operator could warn anyone underneath of the approach of the crane; and, finally, a brush or prong to move along in front of the crane wheels and push aside a hand or a foot resting on the rail of the runway before it could be caught or crushed by the wheels.

It is said that the first dav a crane was fitted with the prong attachment, a workman, who was working with one leg across the crane track, was thrown aside and his leg saved from being crushed by the wheels. On another occasion a lineman who was supporting himself by placing one arm around the track was shoved away by the prong, and, though he fell ten feet to the floor, was saved from serious injury. Without the prong his arm would have been cut off near the elbow.

Other precautious which have been taken as the result of reports of safety inspectors and committees are these: Projecting set screws have been entirely eliminated. Screws on lathes and other machinery have been covered or boxed in. Cans have been provided with light spouts 10 to 12 feet long for oiling machinery, in order that the oilers may not be com-

pelled to go into dangerous places. Rails have been furnished for all walks along lines of shafting. Handrails have been provided for all scaffolds for painters and riggers. A painters' chair with a safety belt has been adopted, so that if the man using it were to fall out of his seat, the belt would hold him. Counter weights have been boxed in so that they cannot fall on anyone in case the attached rope or chain breaks. Covers have been made for emery wheels so that if the wheels break the pieces cannot fly off and do damage.

When specifications are sent from the mills of the Steel Corporation for new machinery or for building new appliances, they are checked up to see that the latest safety provisions are included. In most instances the contracts which accompany the specifications contain this provision:

"Safeguarding of gears, planers, couplings, collars, set screws, etc., will be covered as fully as possible in the drawings which are furnished. But it is understood that these things shall be subject to the approval of our inspectors who shall have free access at all times to the machinery while it is in process of construction and erection."

Other corporations cause to be printed on the stationery of their purchasing departments this motto:

Provisions for safeguarding workmen should be brought to our attention as we will consider them in selecting new machinery and equipment."

Often in big enterprises an effort is made to impress upon the workmen the necessity for using care. Instructions are printed on their pay envelopes that they must be careful of themselves and of their fellows. Similar instructions are also frequently stamped on time sheets and requests for material.

Some of these instructions are:

"Always be careful and take no risks.

"You are responsible for the safety of others as well as yourself.

"Carelessness as to the safety of yourself or others will be sufficient cause for dismissal."

Another result of inspection has been the more frequent placing of warning signs around dangerous machinery. For instance, in many mills of the Steel Corporation notices are posted at ladders or runways leading to cranes, instructing workmen to notify the crane operator before doing any work on the crane; over valves, switches and control levers, to guard against their being started while men are working where they may be injured; over elevators to show when they are in operation and when they are not; and over electric switch boards (often in five or six languages) to show the voltage and whether the current is on or off.

The steps taken by the corporations I have referred to suggest what can be done along similar lines in other industries. Some system of inspection can be established even in the smallest plant, and where workmen are employed in any numbers safety committees can be organized with good results. Even the most limited inspection will prove profitable. It will bring inquiry and investigation, and wherever either is found, there also will be found reform and a striving for better things.

FIRE INSURANCE AND FIRE PROTECTION AS APPLIED TO THE GAS AND ELECTRIC BUSINESS.[1]

BY R. J. CANTRELL.

Why we cannot afford any more, or as well, as other lines of business to be included among the industries throughout the United States that annually contribute to the $215,084,709.00, or an annual per capita fire loss of $2.51, as against 33 cents per capita loss in Europe.

In the first place no gas or electric company operating under the most favorable conditions, can afford to allow its properties, and especially its producing plants, to be consumed by fire.

Secondly: We cannot afford to lose the revenue incidental to losses by fire.

Thirdly: We cannot afford the natural criticism and loss of prestige on account of resultant poor service or the wiping out of years of labor in advertising and building up a reputation for good and continuous service.

We all know it is becoming the habit among the fire departments and newspapers throughout the country, when a fire is discovered, and of which there is no positive proof as to the origin, to credit such fire to "crossed wires," whatever that may mean to the reporter who writes the article. It is an easy way to account for a fire and at the same time there are so many other causes, that it behooves the gas and electric companies themselves, to use every precaution toward eliminating electric wire fires, not only in their own properties, but throughout the cities wherein they operate. The stigma which attaches to gas and electric companies through criticism on account of fires should not exist. It hurts us with the public; it is an argument often used by unscrupulous salesmen for oil, gasoline and kindred appliances, and the gas and electric companies themselves should use every endeavor to remove this condition.

Following this line of thought, if a fire occurs in any city and is credited to the negligence of the gas or electric company, it is a condition over which we have very little control, but on the other hand, if a fire occurs in the plant or on the properties of any gas or electric company, or through the carelessness of our own employes, the criticism is often more severe and our responsibility is increased many-fold, for such a condition should not exist and the causes making such a fire possible, should be removed.

Precautionary Measures.

Cleanliness: Cleanliness is an element to this end. "Cleanliness" covers a multitude of virtues and it removes a multitude of sins. In years gone by there seemed to be a prevailing sentiment that a gas works, and also an electric station—in a lesser degree, should be a place for the accumulation of dirt of various degrees of blackness; that a gas maker would not be healthy or strong if not begrimed from head to foot with lampblack, coal tar, etc., and that an operator in a station should be involved in a certain coating of machine grease; should have a piece of oily waste hanging from his hip pocket and take on a general aspect of a coal heaver—this condition going to prove

[1]Poper read at Eighteenth Annual Convention Pacific Coast Gas Association, Los Angeles, September 21-24, 1910.

conclusively to visiting engineers and officials of the company that such men are hard and tireless workers; as indicated by the dirt in which they had been wallowing.

These conditions, however, have changed and there are at the present time in certain gas works under our supervision, not to mention the electric stations, men who have proven conclusively that a gas works can be kept as clean as any other factory, and even clean, white-washed walls are becoming common throughout our properties.

Cleanliness as above mentioned has a wide scope and should embrace the removal of every item of refuse and unnecessary material from our plants to a safe distance. Old overalls and wearing apparel of all kinds should be discarded and removed entirely from the premises when they have served their usefulness, and not hung behind doors, thrown under benches, etc., and oily waste is one of the most dangerous elements existing and proper cans should be provided for the caring of discarded waste, and also new waste.

Window Glass: Window glass which is broken should be repaired at once, and not left as an opening for live sparks and drafts to communicate fires to out buildings.

Hose Lines: Hose lines should be installed of the best quality of rubber-lined mill hose, with suitable nozzles, and such hose lines should be kept connected at all times, and not used for any other purpose than for fire protection.

Leaky valves and the rotting off of hose lines at valve connections, which is of common occurrence, is avoided by installing drip cocks between the valve and the hose connection, or boring a ⅛-in. hole in the lowest point in the valve or in the connection, outside of the valve, so as to allow any water which may leak through the valve to drip off, and not run down and enter the hose and cause a rot.

Hose reels are becoming more or less obsolete as instanced by their being discarded by fire departments, and the adoption of hose wagons from which the hose can be readily dragged.

Hose houses for outside, weather-exposed places, are preferable with a shelf in such houses made of slats, the hose to be piled on the shelf and which allows of the hose being connected to the valve at all times and given plenty of ventilation to guard against sweating and dry rot, which can happen when a hose is wound tightly on a reel. A plain shelf inside of a building will answer the purpose of a hose receptacle better than a reel.

A common fault is the installation of hose lines of a size too large and longer than can be properly handled by one or two men, and especially where it is necessary to use a hose on a gallery or on a roof. The National Fire Protection Association will not endorse a hose line for one man, larger than 1½ in., as a larger size is considered too heavy for the watchman or one man to handle.

Where city water pressure is not sufficient a pump should be tied into the water system, such pump to be installed on a line by itself, and not jumbled up on different pipe lines feeding water to boilers, scrubbers, or other machinery in the plant.

Electric motor-driven pumps are not recommended for fire purposes, on account of the possibility of the electric current being "cut out" at the time of fire.

Ladders: No plant should be without a ladder for free access to the roofs and our rules provide for stationary ladders, attached to walls of buildings having wooden roofs, insuring their being there when needed, and not down in the corner of the yard under a pile of lumber.

Fire Extinguishers: These are invaluable when properly cared for and regularly examined, cleaned and re-charged. Electric stations are best served with powder extinguishers for fires in large machinery; sand, thrown from buckets on machinery and open switchboard work. Secondly, and in time of dire necessity after the current has been cut off, chemical extinguishers and hose lines should be brought into play.

Wet generator armatures or field coils are of more value than a machine entirely burned out.

Oil fires are best taken care of by sand and chemical extinguishers.

Sand Buckets: Fibre sand buckets only should be used in electric stations; metal buckets being dangerous on account of possible contact.

A rule established by the Pacific Gas & Electric Company, as to the methods of caring for electric fires, calls for the use of dry powder extinguishers first; throw sand on open switchboard, oil and wire fires where the fire can be readily attacked, and where smothering is the main object.

Chemical extinguishers (contrary to the general ideas on this subject) can safely be used (after the current has been cut off from a motor or generator) without harmful effect to such apparatus, it being conceded that a wet machine is better than a machine entirely destroyed by fire. When a chemical extinguisher has been used on a machine, the machine or parts thus dampened should, of course, be taken out and immediately dried.

One of the most careless and wasteful expenditures of money in connection with chemical extinguishers is the purchase of same and the common practice of neglect in their up-keep and re-charging at stated intervals. A system adopted by the Pacific Gas & Electric Company calls for the re-charging of all chemical extinguishers once every six months, and a check system against neglect so to do, consists of a small metal case tacked to the wall alongside of each extinguisher, such case containing a number of cards, with a duplicate stub to each card, and these cards are to be filled in every six months and the stub sent to the general office, showing the date of re-charging. These stubs are filed away, six months hence from the time of last re-charge, and a new stub must be sent in each six months to replace the last one received. Each extinguisher is given an individual tag number. Special attention should be given to the selection of chemical fire extinguishers, there being a number on the market that must be considered dangerous from possible explosions, and others that are defective and worthless.

Three-gallon chemical extinguishers are recommended—larger sizes being too heavy and unwieldy for ready use.

It seems to be a common error that fire fighting apparatus, especially in electric stations, should be crowded onto and behind switchboards, and in dangerous places where a fire is most likely to occur. Fire apparatus should be placed in the open, on columns in the center of the room, or on a wall well removed from the danger point; the object being to allow men to get at the apparatus easily and quickly and then fight their way to a fire, rather than go into a fire empty-handed and grope around for the fire apparatus best adapted to kill such fire.

Fire apparatus should also be installed in **stipulated places** to be decided upon as a "fire station," and kept in such places in order that men may know where to find it in case of fire, and not have to look behind doors and under benches for fire appliances when urgently needed and needed at once.

Watchman's Clocks: Where plants are sufficiently large to warrant a night watchman, watchman's clocks should be used.

Gasoline assumes the elements of a paradox. To the gas and electric men having to do with the commercial end it is always a bugbear—a threat under which to drive a hard bargain before a contract for power or lighting can be closed, and a continual source of annoyance.

To the gas men out on trouble of a certain nature, it means relief—a helping hand and a freer flow of gas.

To the insurance department it is a nightmare, it is on a par with the Prohibitionists' "Demon Rum"; it is a menace to property, to life and limb, and its mere presence means higher rates of insurance and continuous surveillance and inspection of properties.

Do not keep gasoline in your buildings; store it in the yard, and only draw it in the necessary small quantities desired. A book could be written on this subject and it would be long and horrible.

Matches.

Safety matches only should be purchased and allowed employes.

Inspections.

Money spent in inspecting properties and caring for fire apparatus is well spent, but such inspections should be systematic, at stated intervals, and not haphazard, as time flies and apparatus may be useless when urgently needed.

Why Gas and Electric Companies Can Safely Carry Their Own Insurance.

Gas and electric plants are almost constantly guarded, being, in most cases, operated continuously.

A sufficient water supply can always be had and proper hose lines installed if given the necessary attention.

The buildings of a gas plant are a secondary consideration, and their loss by fire does not necessarily mean the shutting down of the plant. Gas plant buildings should be so erected that they will not cause unnecessary damage to the machinery in case the buildings burn.

With proper precautions there is no excuse for fires in electric stations. Oil switches should be built outside of stations wherever possible. Electric apparatus fires are bound to occur, but can be confined if such apparatus is installed in open places and not located adjacent to inflammable structures.

In carrying your own insurance, a sinking fund in actual cash should be created, deposits made monthly, and the old line insurance dropped gradually, leaving the most hazardous properties until the last.

Causes of Fires in Properties of Pacific Gas and Electric Company.

1909.

PROPERTY DESTROYED.	CAUSE.	DATE.
Roof fire	Hot smokestack	2-15-09
Roof fire	Hot smokestack	4- 7-09
Machine shop	Sparks	5-25-09
Sub-station	Electrical	8-22-09
Interior of warehouse	Fire-pot	9-13-09
Interior of sub-station	Arc	9-25-09
Construction camp buildings	Lamp explosion	11-16-09

1910.

Roof fire	Hot smokestack	2- 1-10
Oil tank	Incendiary	2-28-10
Switch house	Breakdown of oil sw.	3- 9-10
Roof fire	Hot smokestack	3- 9-10
Sawmill	Presumably sparks	3-10-10
Wall of gas building	Oil	3-10-10
Wall of electrical sub-station	Electric wires	3- 7-10
Switch house	Breakdown of oil sw.	4-24-10
Roof fire	Breakdown of high tension wires	5-16-10
Warehouse yard	Rubbish—spontaneous.	5-16-10
Packing cases and excelsior	Spontaneous	5-19-10
Stairs in branch office	Rubbish	5-23-10
Frame warehouse building	Unknown	6- 9-10
Purifier house walls	Sparks	6-22-10
Ditch house dwelling	Rubbish	6-26-10
Gasoline fire (man burned)	Matches on floor	6-21-10
Floor slightly burned	Oil switch	7-25-10

PUMPING FOR IRRIGATION IN WASHINGTON[1]

BY H. L. MOODY.

While Nature did wonders for mankind when she created the fertile valleys, rushing streams ad noble forests, the mineral-laden mountains and incomparable climate and rugged scenery in the territory out of which the State of Washington has been carved, she was parsimonious with her rainy days on the east side of the Cascade Range. These majestic peaks seem to act as barriers against the rain-clouds from the Pacific ocean, and, as a result, man has been forced to exercise his ingenuity and mechanical skill in supplying moisture by artificial means. His successes are evidenced by the fact that fully 265,000 of a total of more than 450,000 acres under ditch already have been made highly productive by the application of water from our rivers, lakes, streams and wells, and that the United States government and private corporations are bringing other large areas, approaching 400,000 acres under water.

Practically every modern method of supplying water for irrigation purposes is practiced in the valleys in eastern Washington, where several millions acres of land is adapted to intensive cultivation. The so-called arid belt extends from the eastern foothills of the Cascade mountains to the Idaho border. The land is generally covered with sage-brush and bunch grass. The

[1]Synopsis of address at the Eighteenth National Irrigation Congress, Pueblo, Colo., September 26 to 30, 1910.

soil has the requisite chemical and physical properties, being composed mostly of volcanic ash, decomposed lava and disintegrated basaltic rock, and probably has no equal, certainly no superior, in the world for richness and productivity. Abundant water is available for irrigation, but the chief problem with some has been to get it onto the lands.

Pumps are used in several districts, the power plants ranging from small gas-engine installations to mammoth hydroelectric establishments, and the results have been gratifying in almost every instance where business principles were applied and carried out in the management of the plants.

Many gas and oil engine pumping plants are lifting water from the Columbia river onto many of the lower bars and benches. These plants range from 10 horsepower outfits, lifting about 30 feet, to 250 horsepower installations, working against a 250-foot head. With the coming of water-power developments along the Columbia river it is likely that most of the new installations and many of the older ones will use electricity.

At present there is about 20,000 acres of land under ditch from the Wenatchee river and its tributaries, the Icicle, Peshatin, Mission and Squillchuck creeks. A 75-foot lift, with abundance of power easily developed from the Wenatchee river, will put water onto 4000 or 5000 acres of bench land, making a total of 25,000 acres of irrigated lands in the valley of the Wenatchee. This acreage does not require more than 25 per cent of the minimum flow of the stream during the irrigation season.

The Wenatchee Water Power Company has an appropriation of 150 cubic feet per second from the Wenatchee river. The rights which originally cost $30 an acre, now are held at $100. Maintenance charges are $1.25 to $1.50 an acre.

The Prosser Falls Land, Irrigation & Power Company irrigates about 1600 acres on the south side of the Yakima river, opposite the government's Sunnyside project. The water is lifted 100 feet by pumps, being forced through 1800 feet of 28-inch steel pipe to a penstock, from which the canal heads. The turbines driving the pumps operate under a head of 17 feet. The early contracts provided for one cubic foot per second for 120 acres, while the latter ones agree to give one cubic foot for each 160 acres. Water rights cost $75 an acre and maintenance charges are $1.50 an acre.

The Moses Lake Development Company is lifting water 50 feet with a 40 horsepower gas engine to irrigate 325 acres, some of which is now in young orchards. Maintenance charges are $2.50 per acre per year. Near Moses Lake is a 20 horsepower gas outfit lifting water from a well sunk 29 feet into gravel.

The Fruitland Irrigation Company has a project watering 6000 acres on the east bank of the Columbia river in Stevens county. Water is taken from the Colville river below Meyers Falls.

The Plantations Company's project is between Meyers Falls and Kettle Falls on the Columbia river. The elevation is 1600 feet. This is high bench land and adjoins the Fruitland irrigation properties on the north. Water will be lifted 105 feet by water power into a 100,000-gallon reservoir, from which it is to be carried in a 20-inch wood stave pipe under pressure and delivered to each 10-acre lot from a hydrant. The contracts call for one acre-foot of water per acre between May 1 and September 15.

The Hazelwood irrigated farms are located on a plateau of gently rolling prairie, at an elevation of from 2200 to 2300 feet, covering 2500 acres. The property comes up to within four miles of the city of Spokane. Water supply is lifted by an electrically-driven 15-inch centrifugal pump from Silver lake, a body of clear, potable water, covering approximately 700 acres. This pump, operating against a lift of 60 feet, discharges 8660 gallons a minute through a 36-inch wood stave pipe into a small basin, from which it is carried to the edge of the property in an open ditch.

The distributing system is largely of machine-banded wood stave pipes, through which the water is delivered to the high point of each 10-acre subdivision. The operating company contracts to supply water at the rate of one cubic foot per second for each 200 acres of land. The water is measured to the settler over a weir on his land and is supplied by the rotation method, so that he has always a good head of water with which to work. Maintenance charges are $2.50 per acre per year, which is estimated to be the actual cost of the service.

The Adrian Irrigation Company is installing a pumping plant at Brook lake near Adrian and contemplates watering about 2000 acres from the natural flow of Crab creek.

The Kennewick Canal Company is lifting water from the Kennewick canal 100 feet onto a plateau of 3000 acres immediately west of Kennewick. One cubic foot per second of water is allowed for each 160 acres of land. The water is measured to the consumer over a weir. The maintenance charge is $1.50 per acre per year.

At White Bluffs, on the west side of the Columbia river, the White Bluffs Land & Irrigation Company has installed a pumping plant to lift water 50 feet from the Columbia river onto 2500 acres of sagebrush land at an elevation of 450 feet above sea level. The water is distributed under pressure through machine-banded wood stave pipes ranging from 8 to 24 inches in diameter.

The original installation consisted of two producer gas plants of 100 and 150 horsepower, respectively, supplying gas to two engines, one of 100 and the other of 150 horsepower. These engines were coupled to two vertical centrifugal pumps, one 10-inch pump rated at 3000 gallons per minute and the other a 12-inch pump rated at 4500 gallons per minute. The annual maintenance charge is $2 per acre and the water supplied is one cubic foot per second for each 160 acres.

The water used for irrigating the Hanford lands is pumped from the Columbia river in Benton county, where two pumps, with a combined capacity of 83,000,000 gallons a day, sufficient for 16,000 acres, are in successful operation. The pumps are operated by electric power, which is generated at Priest Rapids, in Yakima county, where a large power plant has been constructed. The induction motors and pumps in operation are of the vertical centrifugal type, carrying the

motor directly connected to the shaft. The speed of the motors is synchronous with the generator and the column of water pumped is controlled by regulating the speed of the turbines. Their nominal capacity of 64 cubic feet per second each at a speed of 175 revolutions per minute.

Just above Pasco, on the Columbia river, is the Moore project watering 1000 acres. The plant consists of a 100-horsepower installation working against a lift of 45 feet. This is one of the largest of the many small plants along the Columbia river.

The Drumheller Development Company's project, irrigating 1600 acres, lifts the water 50 feet. The installation consists of a 100-horsepower gas producer and engine operating a single-stage centrifugal pump with a rated capacity of 3000 gallons per minute.

At Paterson, on the lower Columbia river, is a pumping plant consisting of a 250-horsepower producer gas plant, driving a three-step centrifugal pump operating against a head of 250 feet. The distribution is through pipes and 400 acres of land is watered. When completed the plant is intended to cover 1800 acres.

On Blalock Island, in the lower Columbia basin, is a gas plant pumping water for 500 acres. This is a 100-horsepower plant operating against a maximum lift of 35 feet. The water is distributed through wood and iron pipes. Smaller installations have been made at other places along the Columbia river and water a considerable body of highly productive land.

The Lewiston-Clarkston Company utilizes the water of Asotin creek for power and irrigation purposes. It waters 8000 acres in and about Clarkston, near the confluence of the Snake and Clearwater rivers. The water for these lands and for power is carried from Asotin creek in a 48-inch steel-banded wood stave pipe to the power house from which a 40-inch pipe carries it to the point of division for the two benches. A 32-inch pipe serves the lower bench, and after delivering the water to a power plant the waste is collected in a reservoir for use in irrigating the lower levels. These lands lie generally in two benches and range from 750 to 1250 feet in elevation. The water service is entirely through pipes and is measured to the consumer through a disk meter.

The Pasco Power & Water Company, a few miles above the mouth of Snake river, is installing a pumping plant to water about 12,000 acres of sandy land in the vicinity of Pasco. The present installation consists of a cycloidal rotary pump working against an 85-foot head and driven by a water turbine under a nine-foot head.

The La Follett orchard of 325 acres at Wawawai gets most of the water needed from Wawawai creek and supplements it by pumping from the Snake river.

The Columbia Canal Company, which has 5000 acres under the ditch near Attalia, is augmenting its water supply by the installation of a 100-horsepower gas engine and a 10-inch horizontal centrifugal pump discharging through a 20-inch machine-banded wood stave pipe under a 28-foot lift. The maximum capacity of the plant is given as 10 cubic feet per second.

The Blalock Fruit Company pipes the sewage from Walla Walla, a city of 30,000 population, to its 900 acres of orchard and vegetable and alfalfa lands. This is supplemented by two artesian wells and water taken from Mill creek.

Peach, at a point where Hawk creek empties into the Columbia river, below the mouth of the Spokane river, which now has 400 acres of peach orchards under irrigation, contemplates putting in a pumping plant to irrigate 200 acres more.

There are several important pumping plants in the Spokane valley, where from 75,000 to 80,000 acres of land is adapted to irrigation. The Spokane valley comprises a comparatively level prairie extending from Spokane to Coeur d'Alene, Idaho, a distance of 34 miles, and for some miles west of Spokane, and from three to eight miles in width. This is closely backed on either side by timbered foothills covered with evergreens. The irrigated and irrigible lands lie at an elevation of 2000 feet.

The soil is composed of a rich black volcanic ash, mixed with small gravel. It is from a few inches to several feet in depth and is underlaid with a thick bed of boulders and gravel. The average rainfall for a long period of years has been 17.91 inches. Previous to irrigating any of this land most of it had been planted to wheat, oats and barley, with an occasional small orchard. It is now largely devoted to fruits.

The Modern Irrigation & Land Company's plant at Opportunity covers 2700 acres and is watered by wells ranging from 90 to 134 feet in depth. The water is lifted by vertical centrifugal pumps, direct-connected to horizontal motors, installed at the bottom of the wells above the high water. More than 50 per cent of the water is distributed in open ditches, the rest mostly in pipes. There is a separate system for domestic use and 48-candle power electric lights. The average cost per acre for water, including domestic supply and lighting is from $5 to $6.50 a year. The maintenance cost is light.

The Vera Land Company's project covers 2300 acres. The land was worth about $75 an acre in 1908. There are three wells on the property, the deepest being 130 feet. The turbine pumps are direct-connected with motors, which are placed in the tunnel above high water. Eighty-five per cent of the water is distributed in cement pipes, the rest in open ditches. This company finds that cement is cheaper than clay pipe and both cheaper and better than wood. The average cost for irrigating and domestic supply and electric lighting is from $5 to $6.50 an acre.

Other pumping projects in the Spokane Valley are at Post Falls, 3000 acres; Hayden Lake, 3200 acres, and Dalton Gardens, 1000 acres. I am told that several companies contemplate adding 4000 or 5000 acres the coming season.

This sums up the salient points of what has been accomplished in a masterly, unspeculative and far-seeing way in conquering the waste places in the state of Washington by pumping water onto the lands—a practical demonstration of a scientific fact that the application of water and intelligent cultivation has transformed thousands of acres of land once a wilderness, so unpromising that it evoked derision in the halls of Congress, into veritable garden spots and peopled it with thrifty, prosperous and optimistic men, women and children, who have found happiness and fortune in the Land of Opportunity.

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The Arc Light

Recent improvements in the efficiency of incandescent electric lamps have been so emblazoned in public attention that equally great increase in arc lamp efficiency has been partially eclipsed. Greater changes have been wrought in the arc lamp during the first tenth of the twentieth century than in all the preceding hundred years since Sir Humphrey Davy first discovered that an "arch" of flame resulted from passing an electric current between two charcoal points.

The sputtering, hissing arc light that many of us recollect in our childhood was ever at the mercy of the wind. Like an oil lamp, it was easily blown out unless operated at such excessively high amperage that the carbons were burned before the night was half over. This was remedied in the early nineties by enclosing the carbons in an air-tight globe which excluded both wind and oxygen, so their life was lengthened twelvefold, though the efficiency was slightly lowered.

Although the arc is inherently best adapted to a direct current which heats the positive carbon so highly that more than four-fifths of the light comes from its incandescent crater, yet the convenience and advantage of alternating current distribution makes its use desirable in many cases. Much ingenuity has been exercised in producing the proper feeding mechanism to meet the present exacting requirements until there are now thousands of arcs operating satisfactorily on alternating current, albeit at lower efficiency. This has been largely corrected in the so-called intensive arc, which employs two positive and one negative carbon.

Having exhausted the immediate possibilities of the carbon arc, scientists next substituted an electrode impregnated with the salts of substances such as calcium, which, when vaporized, gives a luminous stream far brighter than the incandescent carbon tips. This flaming arc gives a soft yellow light with either direct or alternating current. Its chief disadvantages are the fumes and the rapid consumption of the rather costly electrodes. These defects are partly obviated in the regenerative arc lamp in which the heated vapors are kept in circulation before condensing or escaping, thus conserving both the heat of the arc and the vapor supply. Tests have shown that a mean hemispherical candlepower may be produced with one-fourth watt and an electrode life of seventy hours.

The luminous, or magnetite, arc, which has a longer life and better light distribution, can be used only on direct current circuits. This employs an inert copper anode and a cathode tube in which is packed a mixture of the oxides of titanium, iron and chromium, the first being for luminosity, the second for conductivity and the third for retarding the rate of burning. Under this classification there is also the mercury arc, whose unpleasantly colored light may yet be rendered acceptable for general illumination by means of a recently perfected "step-down" fluorescent screen, thus making available this most efficient light-giving source.

PERSONALS.

W. S. Heger, California manager for the Allis-Chalmers Company, is at Los Angeles.

E. C. Bradley, general manager of the Pacific Telephone and Telegraph Company, is at New York.

Harry P. Rice, vice-president of the General Incandescent Lamp Company of Cleveland, Ohio, is at San Francisco.

A. K. Andriano, managing director of the Direct-Line Telephone Company, recently returned to New York City.

Sidney Sprout has returned to San Francisco after making an electrical engineering investigation in San Luis Obispo County.

Thomas M. Debevoise and Franklin Overbaugh are at Del Monte and will attend the jobbers' meeting at Catalina Island next week.

E. C. Jones, chief engineer of the Pacific Gas and Electric Company's gas department, has returned to San Francisco from Los Angeles.

J. A. Lighthipe, engineer for the Edison Electric Co. of Los Angeles, has returned from an automobile vacation trip through Southern California.

C. M. Bliven, apparatus salesman with the General Electric Company, was married September 20th to Mrs. Edna Browning Harlan, at Sacramento.

E. V. D. Johnson, superintendent of the Northern California Power Company, returned to Redding last week after attending a meeting at San Francisco.

O. K. Jones, who was for the past ten years an inspector with the Department of Electricity of the city of San Francisco, has joined the sales corps of the Holabird-Reynolds Company.

Paul Shoup, assistant general manager in charge of the Southern Pacific Company's electric railway lines, has returned to his San Francisco office after spending several days at Los Angeles.

G. A. Harvey, formerly electrical engineer of the International Traction Company, Buffalo, N. Y., is assisting Horatio A. Foster with the Southern California Edison Company, Los Angeles, Cal.

E. Reinhart, manager of the Winnemucca Water and Light Company, who visited San Francisco during the past week, contemplates remodeling his light and water plant at Winnemucca.

A. L. Adams has been appointed superintendent of distribution of the Puget Sound Electric Railway and the Tacoma Railway & Power Company, Tacoma, Wash., reporting to K. C. Schluss, superintendent of power of these companies.

Seton Porter, of Sanderson & Porter, who has spent the past two months at his San Francisco office, departed for New York last Wednesday. Wynn Meredith, Pacific Coast manager for the firm, is still in British Columbia on business connected with a hydroelectric installation.

TRADE NOTES.

The Fort Wayne Electric Works has sold to the Sacramento Valley Power Company of Redding three 300-kw. water-cooled transformers for operation on 55,000-volt circuits.

Charles E. Cookerly, for three years foreman of the Morrison Electric Company of Portland, has purchased the stock and good will of the Pacific Electric Engineering Company of Eugene, Ore.

The General Electric Company reports the sale of the following generating apparatus to the Northwestern Corporation of Springfield, Ore.: H. M. Byllesby & Co., engineers, one A. T. B. 4, 2000 k.w., 1800 r.p.m., 2300 v., horizontal condensing Curtis turbine generator, arranged for 150 lbs. steam pressure.

ANNUAL JOVIAN MEETING.

The eighth annual meeting of the Rejuvenated Sons of Jove will be held at Birmingham, Ala., on October 13, 14 and 15, 1910, this being the home of the reigning Jupiter, Oscar C. Turner, No. 333-3. Birmingham has a Jovian membership of about one hundred, and every one of these members is thoroughly active and interested. They promising all visiting Jovians three live days, and special preparation has been made for the entertainment of the ladies at the Country Club and elsewhere.

The Order of the Sons of Jove is a fraternal order of electrical men throughout the United States, Canada and Mexico. It has now a membership upwards of four thousand and is growing rapidly. During the past year the membership has been increased by over one thousand members in all parts of the country. The object of the order is frankly commercial. It aims to bring about a greater degree of harmony and co-operation among those engaged in the same line of business by getting into closer contact all branches of the industry. It strives to eliminate petty jealousies, unfair methods of competition and elements of friction; to increase the common market by co-operative advertising, Jovian lunch clubs where questions touching on the welfare of the business are discussed, and the cultivation of the spirit of harmony and loyalty.

The order was founded in the South in 1899, but for several years did not spread outside of the original territory, During the past three or four years the growth has been phenomenal and to-day the order is one of the recognized forces for good in the entire electrical world. Its membership includes many of the best known men engaged in electrical pursuits, all of whom are active in the furtherance of its objects.

ALEXANDER HENDERSON MEMORIAL FUND.

In the death of Alexander Henderson, the entire electrical fraternity lost not only a pioneer and an indefatigable worker in its cause, but to many the loss is a deep and personal one. To those who knew him best what a world of meaning now attaches to the hearty hand clasp and the familiar "How." With it from him went the unspoken but unselfish cheer and good will. Never a word nor thought of envy nor criticism for a business rival or competitor; he spoke no ill of any man.

A short time before his death, two friends stood by his bedside, grasped his nerveless hands and greeted him with the old familiar "How." A faint smile and flash of understanding in the fast dimming eyes conveyed to all three its broader and deeper significance.

In this hurly burly strenuous every day life of ours there is too little of the deeper sentiment which should be part of our nature and life. We may appreciate for the day or time being those little acts of kindness and thoughtfulness of which we are recipients but are too apt to forget. Shall we forget shortly these many acts of kindness, thoughtfulness, tact and courtesy of which we are all recipients time and again? Thoughtful acts which many times meant self sacrifice.

To quote a friend:

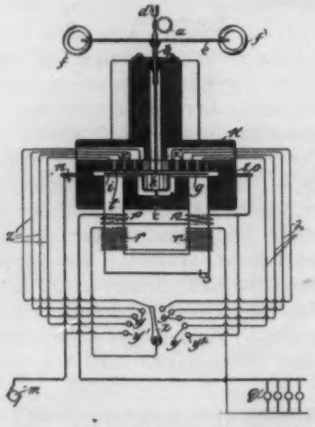
"We were content to know and love the Alex. Henderson of the hour, and how much we did like and admire him we hardly ever realized until he was gone from us forever. This is too often the way with us mortals—we only appreciate at its real worth that which has been lost."

Let us then show the esteem and appreciation we held for the man who has gone from us, by a lasting memorial which will symbolize in enduring stone the deeper significance of his "How."

A committee has been formed to carry out the suggestion of erecting a memorial, contributions being requested from the manufacturers, jobbers, contractors, inspection department, Sons of Jove and technical press.

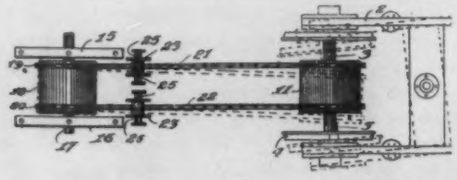
PATENTS

970,498. Electric Meter. Jesse Harris, La Fayette, Ind., assignor to Duncan Electric Manufacturing Company, La Fayette, Ind. An electric meter including an armature, a liquid-containing chamber inclosing said armature, circuit



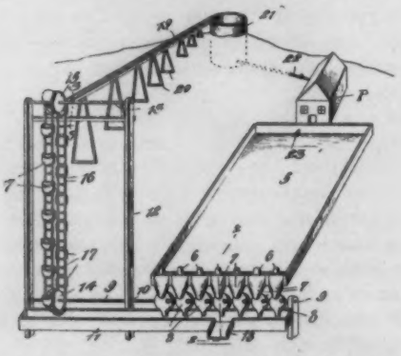
connections whereby the liquid may be included serially in a distribution circuit, and regulable means whereby varying portions of the liquid may be included across the mains of the distribution circuit.

970,543. Railway Power Transmission. Albert S. Parsons, Berkeley, Cal. In a device of the character described, a vehicle, a power shaft therefor, a drum-shaped pulley having sprocket teeth on its periphery adjacent to each end thereof, said pulley being universally mounted on and driven by said



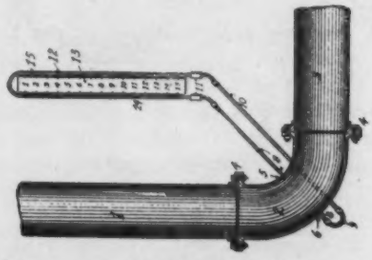
shaft, an axle mounted in a pivot support and spaced apart from said power shaft, a drum-shaped pulley having sprocket teeth on its periphery adjacent to the ends, said pulley being universally mounted on and driving said axle, and sprocket chains connecting said pulleys.

970,796. Supply System for Water-Power Plants. Charles Franklyn Clark, Calistoga, Cal. A water supply system of the character set forth comprising a main reservoir adapted to be arranged adjacent to a body of water affected by the tides,



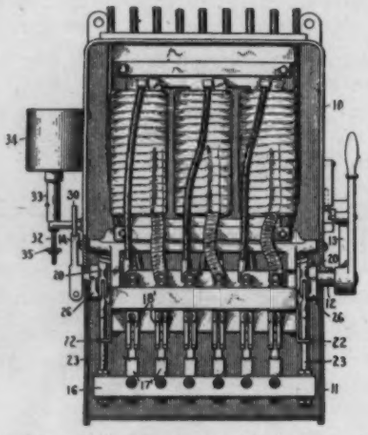
said reservoir being filled by the rise of the tide, a power shaft mounted in bearings adjacent to one end of the reservoir, means for controlling the discharge of water from the reservoir, means arranged on the shaft to receive the water so discharged and rotate said shaft, a frame structure arranged adjacent to the reservoir, a shaft mounted in the upper end thereof, a sprocket on the power shaft and the shaft in the upper end of said frame, and endless chain connecting said sprockets and carrying a plurality of buckets, a trough arranged beneath said shaft to receive the water discharged from the reservoir, said buckets being adapted to elevate a portion of the water to the top of the frame, a second reservoir arranged at a higher elevation than the first named reservoir, an inclined flume extending from the upper end of the elevator to said reservoir, and a water conducting pipe connecting said reservoir to the power plant.

970,965. Method of Measuring the Flow of Fluids. James Buckner Speed, Berkeley, Cal., assignor of one-half to Andrew Murray Hunt, Berkeley, Cal. A process of measuring the rate of flow of a fluid which consists first in causing the fluid to flow through a curved conduit which is filled by the fluid and has a uniform circular cross section, and the center line thereof a constant radius of curvature for a part at least of



the length of the curved portion; second, in measuring the difference between the pressures on the inner surfaces of the concave and the convex sides of said part; third, in computing the flow according to a suitable rule which takes into account the diameter of the circular section, the radius of curvature of the curved conduit where it is uniform, and the said difference in pressure.

970,478. Circuit-Controlling Device. Parker Dunning, Schenectady, N. Y., assignor to General Electric Company. A starting device for electric motors comprising a starting switch and a running switch pivoted concentrically and both biased to open position, an operating handle pivoted concen-

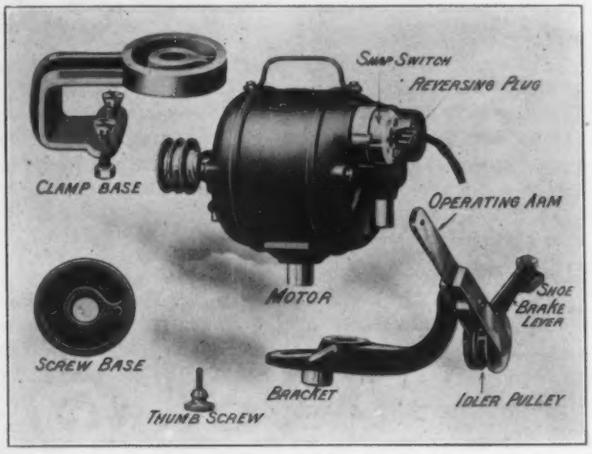


trically with said switches and movable independently thereof, said handle being arranged to close the starting switch and open the running switch when moved in one direction and to close the running switch and open the starting switch when moved in the opposite direction, and electrically controlled means for locking the operating handle in running position.

INDUSTRIAL

WESTINGHOUSE GENERAL UTILITY MOTOR.

The general utility motor now being placed upon the market by the Westinghouse Electric and Manufacturing Company marks the latest advance in the application of electric motors to household convenience. By means of its special attachments the motor can be adapted to a variety of uses about the house. The new motor commends itself heartily to



Westinghouse General Utility Motor.

the favor of central station companies, as it provides another wedge for the introduction of electricity into the home. Furthermore, it is essentially a day load. The motor takes from 40 to 120 watts for its operation.

The general utility motor can be readily arranged to operate the following devices: Family sewing machine, buffing,

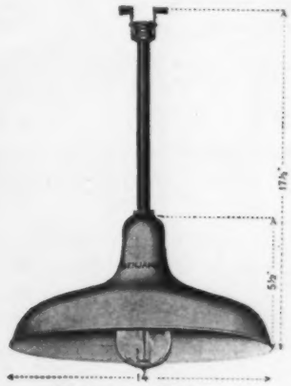
Motor Polishing Silverware.

polishing and grinding wheels, ventilating blower, jewelers' lathe, light machinery, small lathes, sign flasher, moving window display, mechanical toys, etc. The motor is sold complete with one or more attachments. Further attachments can be obtained by the purchaser as desired. A different attachment is not necessary for every one of the uses mentioned above, as some of the attachments make the motor available for several purposes without change. The general utility ventilating outfit is one of the features of the new apparatus. The small blower will supply fresh air to the kitchen, increase the draft of a furnace, remove foul air from sick rooms, and readily adapt itself to any small ventilating work. By fitting the blower openings with suitable pipe, air currents can be directed wherever desired.

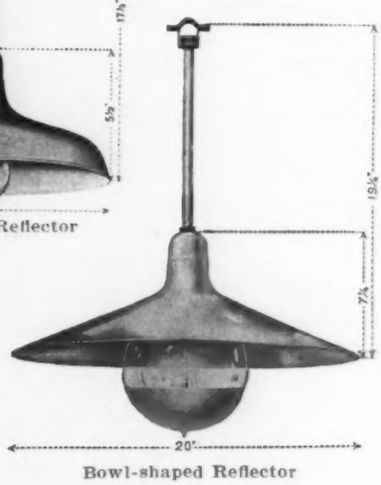
The general utility motors are made for operation on 115 and 230 volt direct-current circuits, and on 110 and 220 alternating circuits of 60 and 133 cycles. The direct-current motors are shunt wound, while the alternating-current motors are of the induction type, single phase. The motors run at a speed of 1700 r.p.m. The motor is light and can be easily carried from place to place by means of a handle in the top of the frame. It is artistically finished in black enamel to harmonize with the other house decorations. The applications of the attachments are positive; it is impossible to put them on wrong.

BENJAMIN REFLECTOR SOCKETS.

A new line of devices is being placed upon the market by the Benjamin Electric Mfg. Co. of Chicago. They consist of a deeply hooded one-piece enameled steel reflector with threaded brass bushing tightly clamping the reflector between two leather washers and an especially designed receptacle or socket. Reflectors furnished are of two general types—flat cone (distributing), for wide distribution, and bowl-shaped



Flat Cone Reflector



Bowl-shaped Reflector

(diffusing), for medium distribution. The hooded portion varies in diameter to accommodate three kinds of lamps, namely, carbon and short base, skirted base, and large base. Reflectors suitable for intended distribution may thus be secured. Each is designed for use with a definite range of lamps and with particular regard for the correct relation of lamp filament and reflecting surface. The present demand for fixtures permitting the use of large base, i. e., 400 and 500 watt metal filament lamps, practically assures the commercial success of this line of devices.

NEWS NOTES

FINANCIAL.

CORNING, CAL.—A special bond election will be held October 4th to vote on incurring a bonded indebtedness of $46,800 for waterworks system and $22,000 for sewer system.

SANTA BARBARA, CAL.—The City Council will receive sealed bids up to 5 p. m. October 6th for the purchase of waterworks extension tunnel bonds in the sum of $40,000, which is a part of the $200,000 voted; bonds are $1000 each at 4½ per cent.

PORTLAND, ORE.—Pooling their claims, aggregating $800,000, creditors of the Deschutes Irrigation & Power Company have joined in a petition for an immediate foreclosure of the first mortgage on the company's property. The order was granted by Judge Charles E. Wolverton, who appointed Receiver C. M. Redfield a special commissioner to handle the sale. It is announced by L. G. Addison, representing the Ohio bondholders who caused the Deschutes Irrigation Company to be placed in the hands of a receiver as bankrupt, that every effort will be made to protect the investment of the 600 or more stockholders. As intended at this time and as a part of the plans under which action was taken last week, the creditors will buy in the property at the advertised sale and will immediately wind up the affairs of the Deschutes Irrigation & Power Company by the organization of a new holding company. The new concern will be called into existence for the sole purpose of handling the assets in such a manner that the debts may be cleared from the records and a dividend secured to the stockholders.

INCORPORATIONS.

ALAMEDA, CAL.—The Sunset Power Company has been incorporated by C. B. Greeley and T. Turner with a capital stock of $500,000.

ELMA, WASH.—The Olympic Railway & Power Company, capital $3,000,000, has been incorporated by F. W. Downs and Thorvald Hvam.

SAN FRANCISCO, CAL.—The Gough Street Railway Company has been incorporated by A. J. Pon, David Livingston and Charles Loisch, with a capital stock of $60,000.

RIVERSIDE, CAL.—The Trujillo Water Company has been incorporated by S. C. Evans, M. S. Evans, M. M. Grip and others of Riverside, with a capital stock of $2640.

TRANSMISSION.

RICHMOND, CAL.—The Great Western Power Company has asked for a franchise to set poles, string wires, etc., for supplying electric power to consumers.

ALBANY, ORE.—The County Court has granted the franchise of the Tri-State Railway & Power Company for an electric power line from this place to Eugene.

ANACORTES, WASH.—The Anacortes Water & Light Company is doubling the capacity of its plant, installing new and up-to-date machinery that will supply continuous power for manufacturing concerns.

TOPPENISH, WASH.—Charles D. Fullen, attorney, 1063 Empire building, Seattle, has secured control of the reservation electric light plant at Toppenish. Julian Fullen has been elected general manager of the company and will take full charge of the plant.

SEATTLE, WASH.—The Western Steel Corporation has arranged with the Olympic Power & Development Company for 2500 horsepower, to be delivered within eighteen months, with an option of 2500 additional horsepower. The Olympic Power & Development Company is now building a $500,000 power plant on the Elwha river, six miles above Port Angeles.

TOMBSTONE, ARIZ.—Within the next few months a new power line will be installed between Prescott and Jerome, supplying power to that district from the Prescott Gas & Electric Company. One line is already in operation, but a new one will be installed to furnish additional power and to act as a substitute line in case of damages to the wires now in use.

SAN FRANCISCO, CAL.—The Sierra & San Francisco Power Company is constructing an 18,000-volt pole line about 15 miles in length for the purpose of connecting Modesto with its main tower-line. Heretofore the town has had to depend entirely upon the Knights Ferry power plant for current. In the future there will be two independent lines from the above system into Modesto, where a new substation will be installed.

SAN FRANCISCO, CAL.—George W. Bacon and F. J. Jackson, general manager of the Sierra & San Francisco Power Company, with J. G. Anderton, the Sonora manager, recently made a tour of inspection of all the company's dams and dam sites on the South Fork of the Stanislaus river, above Strawberry. The lower Strawberry dam has been in a bad condition for some months. The equipments employed at Relief will be transferred to the Strawberry reservoir and a large force of men will be put to work to complete as much as possible before the heavy snow fall. The work will again be resumed in the spring until the reservoir is in first-class condition, materially increasing the storage capacity of the dam and preventing an occurrence of the shortage of water experienced this season.

ILLUMINATION.

NYSSA, ORE.—The City Council has granted to the Idaho-Oregon Light & Power Company a 25-year franchise for an electric light system. The system is to be installed in the course of six months.

PORTLAND, ORE.—J. W. Travers has petitioned the Council for a franchise to operate a gas plant, to be located in the Rose City Park district. If the franchise shall be granted work will be started immediately on the plant, to cost $100,000.

LOS ANGELES, CAL.—The Los Angeles Gas & Electric Company, owner of the Western Boiler Works, will erect in place and connect to present suction gas piping and steam exhaust pipe certain pipe lines, etc., for a gas plant at Aliso and Center streets, at a cost of $2500.

LA GRANDE, ORE.—The Eastern Oregon Light & Power Company, representing a consolidation of the Baker City Light & Power Company, the Fremont Company and the Grade Ronde Power Company, with principal offices in Baker City, has under advisement the extension of its lines to Imbler and Elgin, a distance of some 20 miles.

SALINAS, CAL.—John M. Gardiner, vice-president of the Monterey Electric Light & Power Corporation, who has been acting as chief executive since the death of the president, George Hazelton, has been assigned the duty of reorganizing the finances of the concern. He says: "In the improvements we have mapped out for this section we are figuring on the ultimate extension of the electric line. The company will invest $500,000 in improvements in this county during the next 12 months. They include extensions of the water system of Salinas and the betterment of the gas service."

TRANSPORTATION.

LODI, CAL.—The Central California Traction Company has decided to run a loop through this city.

SAN DIMAS, CAL.—F. A. Hamm, who owns a ranch of ten acres at San Dimas, has been awarded $1200 for a right of way across his property that takes up one acre which is desired by the Pacific Electric Company for an extension of its Covina line.

POMONA, CAL.—Work on the extension of the Pacific Electric road between Claremont and Upland is delayed. Rails and ties have been on hand for some time and citizens who provided the right of way are anxious for some action on the part of railroad officials.

SAN DIEGO, CAL.—The City Council will receive sealed bids up to 11 a. m. October 3d for a certain franchise to construct, maintain and operate for a period of 25 years a street railway on Fifteenth street, from K to M streets. The San Diego Railway Company has applied for the franchise.

PHOENIX, ARIZ.—General Manager Mitchell of the Phoenix Railway Company has made the statement that if plans already made by the company are carried out the company will spend between $125,000 and $135,000 in Phoenix and vicinity on improvements and extensions on the line before July 1st of next year.

SALT LAKE, UTAH.—The County Commissioners have granted the amended franchise for operation of an interurban electric railroad to Leo Neilsen and his associates. The route is from Wellsville to Hyrum, thence along the east edge of the valley to Logan, touching the towns of Millville and Providence. From Logan, it goes through Greenville to the Idaho State line, passing through Hyde Park.

BERKELEY, CAL.—Superintendent W .R. Scott of the Southern Pacific Company announces that within six months the time of transportation between Berkeley and San Francisco will be shortened ten minutes on the S. P. ferry system, and the fast time of 35 minutes now made by the Key Route Company will be shaved five minutes, landing passengers on either side of the bay in just an even half hour.

ALAMEDA, CAL.—Industrial Agent F. W. Hoover of the Southern Pacific has informed the Council that, owing to a delay in filling the rolling stock orders, the new electric train service will not be put in operation until next April. The Council has granted to the company a power line franchise to enable the company to build a connecting pole and trolley line from the auxiliary plant on the Fruitvale side of the tidal canal to connect with the new Alameda electric line.

FRESNO, CAL.—F. S. Granger of the proposed Fresno-Hanford Interurban Railroad, which will now extend only to Kingsburg, leaves this week for New York, where he will complete arrangements for the starting of work on the new road. The bonds have all been subscribed. The Hudson Counties Improvement Company, a subsidiary organization to the Carnegie Trust Company, in which the bonds will be held, is to build the local road. Mr. Granger states that the rights of way for the road are all in good shape and that the deeds will be placed on file while he is away.

LOS ANGELES, CAL.—At a special meeting of stockholders of the Los Angeles Railway Company, recently held at Santa Barbara, the question of increasing the capitalization of the company from $5,000,000 to $15,000,000 was considered. There were present H. E. Huntington, Howard Huntington, Ward, and W. F. Herrin, representing the S. P. interests in the company. These bonds are to cover improvements now under way and extensions that are needed to supply increased traffic wants of Los Angeles. President H. E. Huntington explained this large issue by saying that it was to provide for considerable work that had been done, and more work that is to be done.

SAN DIEGO, CAL.—Transfer of the franchise and holdings of the Keller-Kerckhoff Company's railroad, destined to extend from this city to Del Mar and eventually to Los Angeles, is reported. The Santa Fe is said to be the purchaser. The holdings include a franchise and right of way through the city limits to Del Mar, which is just outside the city. The Keller-Kerckhoff holdings in the main consist of a franchise and a partially graded roadbed. It is said to be the intention of the Santa Fe to use the right of way for the extension of its line from Del Mar into San Diego by way of La Jolla.

SAN FRANCISCO, CAL.—The Supervisors have adopted a resolution formally accepting the bid submitted by T. W. Forsyth for the purchase of the franchise for the proposed extension of the Parnassus-avenue street railway, from the Affiliated Colleges to Judah street, Ninth avenue and Pacheco street, the bidder agreeing to meet the charter requirements by paying the city 3 per cent of the gross receipts of the new road for the first five years of the life of the franchise, 4 per cent during the next ten and 5 per cent during the final ten years. The road will be built and operated by the United Railroads Company, to which the privileges secured by Forsyth and his associates will be turned over, together with the $40,000 bonus raised by interested property-owners.

WATERWORKS.

RED BLUFF, CAL.—Secretary E. D. Warmoth of the local Chamber of Commerce has filed notice of location on 300,000 inches of water to be taken from the Sacramento river and used for domestic, irrigation and power purposes. The point of diversion is on the west bank of the river near the site of the dam of the Iron Canyon project, and the importance of the location depends on its relation to that project.

PLACERVILLE, CAL.—A deed of trust and other papers have been filed here which indicate the formation of a water and electric company to develop power from 50,000 inches of water from Rock Bound lake and Buck Island lake above this city. The company owns 25,000 inches from each place and will build dams to increase the capacity. Arthur Bloch of Oakland is back of the deal and the filings were made in his name. The Mercantile Trust Company of San Francisco holds the deed of trust.

LOS ANGELES, CAL.—That a franchise granted to a private corporation is no bar to municipal ownership of any public utility, is the decision rendered by Judge Olin Wellborn of the Federal District Court in the case of the Madera Water Company against the City of Madera. The court held that grants and special privileges given by the public are to be construed in favor of the public. In rendering the decision, which was upon a demurrer interposed by the city, Judge Wellborn ruled against the corporation's contention that it held an exclusive franchise, and that in establishing a public water plant the municipality was violating the constitutional rights of the company.

LAKEVIEW, ORE.—Charles McIntyre, an engineer of Spokane, Wash., is here working in the interests of the South Oregon Water Power Company. This company is backed by Spokane capital, and its purpose is to develop the water power of Deep creek, located in the vicinity of Adel. As soon as the necessary rights have been secured the company will put in an initial plant which will develop 2500 h.p., but extensions are contemplated which will enable it to furnish 10,000 h.p. This power will be used in Warner valley, this valley, Surprise valley, California and Catalow valley, Harney county, for municipal, manufacturing and irrigation purposes. A franchise will be sought from the Council of this town so that the company may be enabled to sell their power here. At the present time there is no electric power obtainable during the day time.

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